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Thermophysical Properties of Propane from 85 to 700 K at Pressures to 70 MPa

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Thermophysical Properties of Propane from 85 to 700 K at Pressures to 70 MPa

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THERMOPHYSICAL PROPERTIES OF PROPANE FROM 85 TO 700 K AT PRESSURES TO 70 MPa

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Thermophysical properties of propane are tabulated at integral temperatures over the entire range of fluid states from 85 to 700 K along isobars to 70 MPa by using a modified form of the nonanalytic equation of state. These tables, along with a table for the saturated liquid, include values for density, compressibility factor, internal energy, enthalpy, entropy, heat capacities, fugacity, sound velocity, dielectric constant, and isochore and isotherm derivatives. In addition to the equation of state, equations are presented for vapor pressures, orthobaric vapor and liquid densities, ideal gas properties, virial coefficients, dielectric constants, heats of vaporization, melting pressures, and orthobaric liquid specific heats, enthalpies, and entropies. Coefficients were determined by a least squares fit of selected experimental data, including several new sets of data not included in previous propane correlations. Comparisons between experimental and calculated values are given, including those for sound velocities, heat capacities, P-p-T data, etc.

Key words: Densities; dielectric constants; enthalpies; entropies; equation of state; fugacities; internal energies; isobars; isochores; isotherms; Joule-Thomson inversion; latent heats of vaporization; melting line; orthobaric densities; propane; specific heats; vapor pressures; velocities of sound.

1. Introduction

The present work is a revision and extension of a previous provisional report [32] from this laboratory. Since that report many new data have become available. These include: P-p-T compressibility data [25,42,94,95,102]; some new vapor pressure data [57,66,94,95]; new specific heats [34] and sound velocities [107] for the saturated and compressed liquid; and new dielectric constant data [42,45] for the saturated and compressed liquid. Other correlations (and compilations) for propane [9,16,20,27,41,59, 83,84,86,90,106] should be noted. However, most of these correlations are now outdated with the availability of new and accurate data, often in regions in which data did not previously exist.

In the present work a new procedure is employed for selecting the critical density, and the nonanalytic equation of state has been modified from previous applications [30-33,35,36,38]. Derived heats of vaporization are used to obtain enthalpies and entropies of the saturated liquid, such that the free energy of vaporization is zero. Thermodynamic functions for the compressed liquid then are obtained by use of these derived properties from the triple point to the critical point temperature.

Computations in computer programs (Appendix E) for the present work have been conducted in units of the bar, the mol, and the liter. However, SI units are used throughout this report in tables and equations. Pressures are given in MPa, densities in kg/m³, and temperatures in K. For thermal properties, the mol is used for amounts of substance. Symbols and units used in this report appear in Appendix A and conversion factors in Appendix B. Fixed-point values used here are in Appendix C. References for the principal physical properties of propane are collected in Appendix D. Computer programs for calculation of thermophysical properties of propane are in Appendix E. The density-temperature diagram for propane is presented in figure 1, where the upper, left-hand corner shows the freezing liquid line.

2. Physical Properties and Their Formulation

2.1 Fixed-Point Values

These values are listed in Appendix C.

- (a) The Triple Point. The temperature ($T_t = 85.47 \text{ K}$) is adopted from Das and Eubank [20]. The pressure is given by the present vapor-pressure eq (2). The liquid density is assigned for consistency with data in eq (3). The vapor density is from eq (4) for saturated vapor densities. (In recent work [70] on the triple point temperature of propane, including an investigation of two solid phases, a value of $T_t = 85.52 \text{ K}$ was reported.)
- (b) The Boiling Point. The temperature is from vapor-pressure eq (2) at a pressure of 1 atm = 0.101325 MPa. Liquid and vapor densities are from eqs (3) and (4).
- (c) The Critical Point. Our selected temperature was found to be the same as reported independently by Thomas and Harrison [95]. The pressure, at first found from the vapor-pressure equation by simultaneous fitting with P- ρ -T data, fell between values obtained from two propane samples of Thomas and Harrison, and

thereafter the vapor pressure equation was constrained to this value. The critical density was derived by the liquid volume fraction procedure of Van Poolen [101] using the orthobaric densities of Thomas and Harrison [95]. It is about one percent higher than that derived by Thomas and Harrison and is consistent with the value selected in the correlation of Das and Eubank [20].

2.2 Melting Line and Vapor Pressures

(a) The Melting Line. Experimental pressures from about two to ten kilobars were reported by Reeves, Scott, and Babb [74] as constants for the Simon eq (1). Their extrapolation to zero pressure gave $T_t = 85.3$ K. As their uncertainty in T was at least 1 K, the selected triple-point temperature from Das and Eubank [20] is used here. Melting pressures (P_m) in MPa are given by the relation,

$$P_m = P_t + P_0 \cdot [(T/T_t)^c - 1],$$
 (1)

where $P_t = 1.6895 \times 10^{-10}$ MPa, $T_t = 85.47$ K, $P_o = 718$ MPa, and c = 1.283.

(b) The Vapor Pressures. Data used for adjusting eq (2) appear in the first part of table 1. Other data, weighted zero, appear in the continuation. The low pressure data with ID = 80 are newly derived via thermal loops [32] by use of new saturated liquid specific heats formulated up to 290 K by Goodwin [34]. (See section 2.7.) Define the argument, $x = T/T_c$; then vapor pressures (P_C) in MPa are given by the relation,

$$ln(P_{\sigma} \cdot 10) = a/x + b + c \cdot x + d \cdot x^{2} + e \cdot x^{3} + f \cdot (1 - x)^{\epsilon}$$
, (2)

where ε = 1.35 and, from least squares analysis,

a = -8.7227 80250 d = 12.6857 90059 b = 19.2030 78280 e = -3.8065 42924c = -15.6106 38913 f = 1.8832 14505

The critical-point slope dP_{σ}/dT (0.08113 MPa/K) was constrained to equal the slope of the critical isochore from the equation of state at the critical point, $(\partial P/\partial T)_{c}$.

2.3 The Orthobaric Densities

(a) The Saturated Liquid Densities. Data used for adjusting eq (3) appear in the first part of table 2. Other data appear in the continuation. If the

dependent variable is defined by $y(\rho) \equiv (\rho_{\ell} - \rho_{c})/(\rho_{t} - \rho_{c})$ and x is defined by $x(T) \equiv (T_{c} - T)/(T_{c} - T_{t})$, then the equation for saturated liquid densities is

$$y = x + (x^{\varepsilon} - x) \cdot [a + b \cdot x + c \cdot x^{2}] , \qquad (3)$$

where $\varepsilon = 0.35$ and, from least squares analysis,

a = 0.764389673

c = -0.1150 01817.

b = 0.009457047

Equation (3) is constrained to a triple-point liquid density of 16.630 mol/L, such that the calculated densities at low temperatures are consistent with the most recent and most reliable data sets [45,64,68,75].

(b) The Saturated Vapor Densities. Data used for adjusting eq (4) appear in the first part of table 3. Data at ID = 1 are derived from the vapor-pressure and virial equations. Other data, weighted zero, appear in the continuation of table 3. The following, new formulation of the compressibility factor for saturated vapor utilizes the vapor-pressure equation, and yields $Z_{\sigma} \longrightarrow 1$ as $\rho_g \longrightarrow 0$, a behavior needed when integrating the thermodynamic equation of state. Let $A_0 \equiv (Z_C - 1)$ where Z_C is value of the compressibility factor at the critical point, and define the arguments, $\pi(T) \equiv P_{\sigma}(T)/P_{C}$, $\kappa(T) \equiv T/T_{C}$, and $\mu(T) \equiv (1 - \kappa)$. The saturated vapor densities, $\rho_g \equiv P_{\sigma}(T)/(Z_{\sigma} \cdot R \cdot T)$, then are given by

 $Z_{\sigma}(T) = 1 + A_{\sigma} \cdot \pi \cdot x^{-2} \cdot f(x) , \qquad (4)$

where

$$f(x) \equiv 1 + u^{\varepsilon} \cdot [a + b \cdot x + c \cdot x^2 + d \cdot x^3] , \qquad (4a)$$

 ε = 0.35, and, from least squares analysis,

a = 5.43973368 c = 23.8710761 b = -20.0297592 d = -10.1051069

Column, F(Z), in table 3 gives the experimental residual,

$$F(Z) = (Z_{expt} - I_r) \cdot x^2 / (A_o \cdot \pi)$$

2.4 The Virial Equation

This equation of state usually is accurate at densities up to $\rho_{\text{c}}/5$ when truncated as follows

$$Pv/RT = 1 + B_r(T) \cdot \rho_r + C_r(T) \cdot \rho_r^2 + \dots$$
 (5)

The second and third coefficients, $B_r(T)$, $C_r(T)$, here are dimensionless through use of reduced density and temperature, $\rho_r \equiv \rho/\rho_c$, $x \equiv T/T_c$. Data have been collected in two excellent monographs [24,71]. Table 4 compares selected data with the following fitting functions developed here for propane

$$B_r(T) = B_1 + B_2/x + B_3/x^3$$
, (5a)

$$C_r(T) = (1 - T_0/T) \cdot [C_1/x + C_2/x^5]$$
, (5b)

where

$$T_0 = 342.250 \text{ K}$$
 $B_3 = -0.468 \text{ } 0172$
 $B_1 = 0.478 \text{ } 4915$
 $C_1 = 0.215 \text{ } 0050$
 $C_2 = 4.798 \text{ } 6166$

In present work, only the second coefficient has been used: in thermal loop computations; to synthesize P-p-T data for adjusting the equation of state; and to obtain saturated vapor densities via the vapor-pressure equation.

2.5 The Equation of State

Appendix D and table 7 summarize P- ρ -T data of propane. Inclusion of the recent data of Ely and Kobayashi [25], Thomas and Harrison [95], and of Haynes [42] provides a dense coverage of the P(ρ ,T) surface for propane at densities up to 740 kg/m³ (16.8 mol/L), and at temperatures from 90 to 623 K.

The present equation of state is modified from earlier forms [30-33,35,36, 38]. It is nonanalytic, yielding a maximum in specific heats $C_{\nu}(\rho,T)$ at the critical point.

$$P = P_{\sigma}(\rho) + \rho_r \cdot R^* \cdot [T - T_{\sigma}(\rho)] + \rho_r^2 R^* T_c \cdot F(\rho, T) , \qquad (6)$$

where $F(\rho,T) \equiv B(\rho) \cdot \Phi(\rho,T) + C(\rho) \cdot \Psi(\rho,T)$

For any density, obtain the coexistence temperature $T_{\sigma}(\rho)$ by iteration from eqs (3) or (4) for the orthobaric densities. Place this in the vapor pressure eq (2) to obtain $P_{\sigma}(\rho) \equiv P_{\sigma}[T_{\sigma}(\rho)]$. Densities, $\rho_{r} \equiv \rho/\rho_{c}$, are reduced at the critical point. The gas constant for eq (6) therefore is redefined, $R^{*} \equiv (0.0083145) \cdot \rho_{c}$, MPa/K.

The temperature-dependent functions in eq (6) are defined as follows.

$$\Phi(\rho,T) \equiv x^{\beta} \cdot \exp \left[b \cdot (1 - T_{\sigma}/T)\right] - x_{\sigma}^{\beta} , \qquad (6a)$$

where
$$b \equiv (1 - \beta) + (1 - \beta)^{1/2}$$
, $x \equiv T/T_c$, and $x_\sigma \equiv T_\sigma(\rho)/T_c$.

$$\Psi(\rho,T) \equiv \psi(\rho,T)/\psi_\sigma(\rho) - 1$$
, (6b)

where $\Psi_{\sigma}(\rho)$ is obtained from $\psi(\rho,T)$ merely by replacing T with $T_{\sigma}(\rho)$, and

$$\psi(\rho,T) \equiv 1 - (\omega - \omega^{\eta}/\eta)/(1 - 1/\eta) , \qquad (6c)$$

where $\omega(\rho,T) \equiv [1-\Theta(\rho)/T]$. A value for β was found by trial. The locus of temperatures inside the coexistence envelope is

$$\Theta(\rho) \equiv T_{\sigma}(\rho) \cdot \exp[-\alpha \cdot f(\rho)]$$
, (6d)

where

$$f(\rho) = |\rho_r - 1|^3/((\rho_t)_r - 1)^3$$

 $(\rho_t)_r \equiv \rho_t/\rho_c$ is a constant, and ρ_t refers to liquid density at the triple point. The parameter α is to be found by trial.

The density-dependent coefficients of eq (6) have been developed tediously by trial with data for propane;

$$B(\rho) \equiv B_1 + B_2 \cdot \rho_r^2 \tag{6e}$$

and

$$C(\rho) \equiv C_1 \cdot (\rho_r - 1) \cdot (\rho_r - C_0) \cdot \exp(-\gamma \cdot \rho_r^2) , \qquad (6f)$$

where parameters C_0 and γ are to be found by trial.

The parameters and coefficients of eq (6) for propane are

$$\alpha$$
 = 1, β = 0.70, γ = 0.15, η = 1.1,
 B_1 = 0.4565 0524 198 C_0 = 2.2
 C_1 = -0.2490 4576 736

Table 5 gives behavior of coefficients $B(\rho)$, $C(\rho)$.

Behavior of the calculated critical isotherm near the critical density is shown in table 6. In particular, the slope $(\partial P/\partial \rho_{r,t})_{T_c}$ is seen to have no

negative values. (Densities in table 6 are reduced at the liquid triple point, $\rho_{r,t} = \rho/\rho_t$.) Table 7 gives deviations of experimental densities and pressures from the equation-of-state surface for most available data. Data not used for adjusting the equation of state include those of Tomilinson [98], Deschner and Brown [22], Teichmann [94], and of Warowny, et al. [102].

Some of the preliminary data of Thomas and Harrison [95] (for T > $T_{\rm C}$) that were used in the fit of the equation of state were subsequently adjusted as a result of a small air impurity (0.004 percent) in their sample gas. The maximum change in pressure was 0.017 percent while the average change was 0.004 percent. Such a small change has negligible effect on the equation of state. Comparisons with the corrected data of Thomas and Harrison are given at the end of table 7. The preliminary data, which were used in the fit but do not appear in the table, are represented by data points 720-931 missing from the table. For temperatures less than $T_{\rm C}$, most of the data of Thomas and Harrison (designated in table 7 as points 1460-1988) were obtained with a different sample and they made no adjustments to this data.

On the first page of table 7, a summary of comparisons of P-p-T data with values calculated from the equation of state is given. For the isochores of Thomas and Harrison, deviations in the table are those for the corrected data. For the preliminary data the density and pressure deviations are 0.43 and 0.32 percent, respectively, or approximately the same as those for the corrected data.

An explanation for some of the large density deviations in table 7 (e.g., data points 1626, 1640, etc.) that are exhibited when the data of Thomas and Harrison [95] are compared with the equation of state should be noted. These data points were taken extremely close to the liquid-vapor coexistence boundary. Although the pressure deviations were relatively small (maximum of 0.15 percent) when compared to the equation of state, the pressure deviations were of sufficient magnitude in some regions of experimental data such that the calculated density fell on the wrong side of the "dome" and gave a liquid instead of a vapor density, or vice versa.

It should be noted that the functional form of the equation of state for propane given here also has been used in current work on isobutane [37] and normal butane [43]. Identical nonlinear parameters, except for small differences in γ , have been obtained for all three fluids in optimizing this equation to available P-p-T data.

2.6 The Ideal Gas Functions

Chao, et al. [13] calculated ideal gas thermodynamic properties using spectroscopic data and compared results for the specific heat with other sources. A plot of their $C_p^0(T)$ is linear at low temperatures, changing to the usual sigmoid shape at high temperatures, a behavior that we could not represent analytically. Their enthalpies are represented by use of the arguments x = T/100 and $u = x^{1/3}$;

$$(H^{0} - H_{0}^{0})/RT = 4 + exp(-\epsilon/x) \cdot \sum_{i=0}^{5} A_{i}/u^{i}$$
, (7)

where R = 8.31434 J/($mol \cdot K$), ε = 3, and

$$A_0 = 24.11012$$
 $A_3 = 980.124065$
 $A_1 = 94.40550$ $A_4 = -678.64094$
 $A_2 = -585.32814$ $A_5 = 170.42778$

Specific heats are $C_p^0(T) = dH^0/dT$, but the entropies require numerical integration (SUBROUTINE IDEAL, Appendix E),

$$S^{0}(T) = S^{0}(300) + \int_{300}^{T} C_{p}^{0} dT/T$$
, (7a)

where $S^{0}(300)/R = 32.552$. Table 8 presents the data used for adjusting eq (7), and table 9 gives interpolated results from eq (7).

2.7 Thermal Loop Computations

At temperatures from the triple- to the normal boiling-point, new data have been derived for vapor pressures, saturated vapor densities, and for heats of vaporization by thermal loop computations including ΔH and ΔS for saturated vapor and for saturated liquid. The procedure given by Goodwin [32], and more generally by Yarbrough and Tsai [103], used virial eq (5), ideal gas functions eq (7), the heat of vaporization of Kemp and Egan [53] at the normal boiling point, and the following formulation of the specific heats of Goodwin [34] for the saturated liquid from the triple point to 290 K. Define x \equiv T/369.80, then

$$C_{\sigma}(T) = A_{1} \cdot x/(1-x)^{\varepsilon} + \sum_{i=2}^{5} A_{i} \cdot x^{i-2}$$
, (8)

in $J/(mol \cdot K)$, where

$$\varepsilon = 0.7$$
 $A_3 = 48.01034$
 $A_1 = -1.77942$
 $A_4 = -100.24355$
 $A_5 = 77.12878$
 $A_5 = 135.42504$

The rms relative deviation is 0.13 percent for the 76 data points. (The temperature, 369.80 K, was used as a reducing parameter for x in the original thermal loop computations. Since the fit of the specific heats is independent of the selected temperature over a wide range, it has not been changed to the critical temperature selected in the present work.)

Results for the vapor pressures appear in table 1 at ID = 80, and for the heats of vaporization in table 10 at ID = 40. Saturated vapor densities from the thermal loop computations are replaced in table 3 at ID = 1 by derived data from the fitted vapor-pressure eq (2) and the virial eq (5).

2.8 The Heats of Vaporization

Table 10 shows the "fit" of selected data. Those at ID = 40 are derived via thermal loops (section 2.7). Those at ID = 41 are from the Clapeyron equation. The formulation of these data in kJ/mol uses argument $x(T) \equiv (T_c - T)/(T_c - T_t)$;

$$Q_{\text{vap}} = A_1 \cdot x + (x^{\varepsilon} - x) \cdot [A_2 + A_3 \cdot x + A_4 \cdot x^2]$$
, (9)

where

The uncertainty of at least 0.5 percent in derived data for $Q_{\mbox{Vap}}$ at the higher temperatures will affect compressed liquid thermofunctions at these temperatures, because we use $Q_{\mbox{Vap}}$ to compute ΔH and ΔS across the "dome," from saturated vapor to liquid along isotherms.

2.9 Saturated Liquid Enthalpies and Entropies

Data for saturated liquid enthalpies and entropies have been derived at temperatures from the triple- to the critical-point by use of the ideal gas functions, the equation of state, and the formulated heats of vaporization. The enthalpies then have been formulated, as shown in table 11. Define the variables

$$x = (T_c - T)/(T_c - T_t)$$
, $y = (H_\sigma - H_c)/(H_t - H_c)$,

when the enthalpies, $H_{\sigma}(T)$, are described in J/mol by

$$y = x + (x^{\varepsilon} - x) \cdot \sum_{i=1}^{7} A_i \cdot x^{i-1}$$
, (10)

where
$$\epsilon$$
 = 0.37, $\rm H_{t}$ = 0.001 J/mol, $\rm H_{c}$ = 33082.187 J/mol and

$$A_1 = 0.2998 57304$$
 $A_5 = -0.9494 39705$ $A_2 = 0.3868 58687$ $A_6 = 0.1462 98673$ $A_3 = -0.6240 97828$ $A_7 = 0.1113 75514$ $A_4 = 1.0360 03301$

The formulation of saturated liquid entropies in $J/(mol \cdot K)$ is shown in table 12. Let $x = (T_c - T)/(T_c - T_t)$ and $y = (S_\sigma - S_c)/(S_t - S_c)$, then

$$y = x + (x^{\varepsilon} - x) \cdot \sum_{i=1}^{8} A_i \cdot x^{i-1}$$
, (11)

where
$$\varepsilon$$
 = 0.32, S_t = 82.56147 J/(mol·K), S_c = 234.72617 J/(mol·K), and

$$A_1 = 0.1263 \ 07708$$
 $A_5 = 14.0277 \ 6880$ $A_2 = -0.7539 \ 54622$ $A_6 = -20.6289 \ 4506$ $A_3 = 1.2532 \ 70427$ $A_7 = 16.0117 \ 8434$ $A_4 = -5.9696 \ 10330$ $A_8 = -5.4110 \ 8275$

Specific heats along the saturated liquid path follow from the relation, $C_{\sigma}(T) = T \cdot dS_{\sigma}/dT$, in $J/(mol \cdot K)$, as given in the last column of table 12. For the thermal computations, these derived $C_{\sigma}(T)$ values are replaced by our formulation of experimental data, given below in section 4.1.

All of the above saturated liquid formulations for $H_{\sigma}(T)$, $S_{\sigma}(T)$, and $C_{\sigma}(T)$ are used to compute thermodynamic properties for compressed liquid states at T < $T_{\rm C}$.

2.10 Dielectric Constants

Table 13 presents experimental and calculated dielectric constants, ε , for the saturated vapor [89] and liquid [45,89] and for the compressed liquid [42] of propane. These data are formulated via the Clausius-Mossotti function,

CMF =
$$[(\varepsilon - 1)/(\varepsilon + 2)]/\rho$$
, cm³/mol (12a)

The following formulation has been used to tabulate ε along isobars in table 21 at temperatures extrapolated up to 450 K, and at pressures up to 70 MPa. Define the variables,

$$x \equiv T/T_C$$
, $\rho_r \equiv \rho/\rho_C$,

where P is in MPa, when

CMF =
$$A_1 + A_2 \cdot \rho_r + A_3 \cdot \rho_r^2 + A_4 \cdot \ell n (1 + 1/x) + A_5 \cdot P/10$$
 (12b)
 $A_1 = 15.562 6310$ $A_4 = 0.5107 4051$
 $A_2 = 0.385 8141$ $A_5 = -0.0045 1412$
 $A_3 = -0.150 9977$

Data at high pressures have a diminished weighting as seen in table 13. The rms relative deviation for 260 points is 0.048 percent in the CMF, and 0.018 percent for the dielectric constants.

Comparisons are not given in table 13 for data not used in the fit to eq (12). The dielectric constants of Pan, Mady, and Miller [69] at temperatures from 91 to 115 K differ from those calculated from eq (12) by approximately 0.8 to 1.0 percent while those from Thompson and Miller [96] and Luo and Miller [62] at temperatures between 220 and 288.7 K agree within 0.1 percent with values calculated from eq (12).

3. Computational Methods

The numerical values for E and H in this report are based on the assigned value, E = 0 at the liquid triple-point, obtained by use of the arbitrary value, $E_0^0 = 21,888.910$ J/mol. Specific heats of Kemp and Egan [53] could be integrated to give the solid at T = 0 as reference state.

3.1 The Homogeneous Domain

The homogeneous domain of figure 1 includes all regions which can be attained along isotherms starting at zero density without crossing the vapor-liquid "dome," and without passing very close to the critical point at $T > T_{C}$.

Computations start with ideal gas thermodynamic functions at zero density, and then continue by integrating along isotherms by use of the equation of state in the following relations,

$$\Delta E = \int [P - T \cdot (\partial P/\partial T)] \cdot d\rho/\rho^2 , \qquad (13)$$

$$\Delta C_{v} = -T \cdot \int (\partial^{2}P/\partial T^{2}) \cdot d\rho/\rho^{2} , \qquad (14)$$

$$\Delta S = R \cdot \ln[P^{0}/(\rho RT)] + \int_{0}^{\rho} [R - (\partial P/\partial T)/\rho] \cdot d\rho/\rho . \qquad (15)$$

Equation (15) is for use with initial entropies in hypothetical ideal gas states at $P^{O} = 1$ atm (0.101325 MPa). For all other initial states,

$$\Delta S = -\int (\partial P/\partial T) \cdot d\rho/\rho^2 . \qquad (15a)$$

In each (ρ,T) state, reached by above integrations, the following are computed,

$$H = E + P \cdot v , \qquad (16)$$

$$C_{p} = C_{v} + T \cdot (\partial P/\partial T)^{2}/(\partial P/\partial \rho)/\rho^{2} , \qquad (17)$$

and

$$W^2 = C_p \cdot (\partial P/\partial \rho)/C_v . \tag{18}$$

3.2 The Saturated Liquid

At temperatures from the triple point up to the critical point, thermofunctions for the saturated vapor are obtained via eqs (13) through (16). Then eq (9) is used for the heat of vaporization, $Q_{\rm vap}$, to compute

$$\Delta H = -Q$$
 , $\Delta S = \Delta H/T$, (19)

such that the free energy of vaporization, $\Delta F \equiv \Delta H - T \cdot \Delta S$, is zero (see section 2.9). Having obtained H and S for the saturated liquid, $E = H - P \cdot v$ is computed.

The single-phase specific heat, $C_{\nu}(\rho,T)$, at the saturated liquid boundary, is obtained via eq (23) for $C_{\sigma}(T)$, given below, and the thermodynamic relation,

$$C_{V}(\rho,T) = C_{\sigma}(T) + T \cdot (\partial P/\partial T) \cdot (d\rho_{\ell}/dT)/\rho_{\ell}^{2}, \qquad (20)$$

where ρ_{ℓ} is density of the saturated liquid. Values for $C_p(\rho,T)$ and $W(\rho,T)$ on this boundary follow from eqs (17) and (48). For liquid at the normal boiling point, the following values have been obtained,

$$T_b = 231.068 \text{ K},$$
 $H_b = 13135.9 \text{ J/mol},$ $E_b = 13128.2 \text{ J/mol},$ $S_b = 171.288 \text{ J/(mol*K)}.$

3.3 The Compressed Liquid

Starting with above values for E, S, and $C_{\rm V}$ on the saturated liquid boundary, eqs (13), (14), and (15a) are used to integrate along isotherms, and then H, $C_{\rm D}$, and W are obtained via eqs (16), (17), and (18).

3.4 Fugacity Coefficients

The fugacity coefficients in table 21 were computed along isotherms relative to properties in hypothetical ideal gas states at a pressure, $P^0 = 1$ atm (0.101325 MPa),

$$(f/P) = (P^{O}/P) \cdot \exp \left[\Delta F/RT\right] . \tag{21}$$

For any (P,T) point, the isothermal free energy change is

$$\Delta F = (H - E_0^0) - H^0 - T \cdot (S - S^0)$$
, (22)

in which the arbitrary value of E_0^0 was added to tabulated values of H(P,T) such that E(P,T)=0 for liquid at the triple point.

3.5 Simplified Computation

Given the subroutines of Appendix E, it is necessary first to call SUBROUTINE PVTDATA, to place constants in common statements. To obtain the density in mol/L at a given T,K and P,bar, it is necessary merely to write the instruction DEN = FINDENF(T,P) for single-phase domains. Coexisting densities are given by the functions DENGASF(T) and/or DENLIQF(T), and the vapor pressure in bar by PSATF(T).

For thermodynamic properties, the subroutine SIMPLE here is an example of how to use the general subroutine THERMO (see Appendix E).

4. Tests and Comparisons

In the provisional report, Goodwin [32] compared some enthalpy differences and residual specific heats with derived results of independent authors, i.e., Kuloor, et al. [59], Eubank, et al. [27], to ensure freedom from gross errors. These now are omitted, as present properties are comparable with the earlier work. Following are some comparisons of experimental specific heats and speeds of sound with calculated values.

4.1 Specific Heats

Table 14 gives a comparison of saturated liquid specific heats, taken from the report by Goodwin [34]. These are formulated with coefficients revised for the present critical temperature of 369.85 K; for the range from T_t to T_c with $x \equiv T/T_c$, the saturated liquid specific heats, in $J/(mol \cdot K)$, are given by

$$C_{\sigma}(T) = A_{1} \cdot x/(1-x)^{\varepsilon} + \sum_{i=2}^{5} A_{i} \cdot x^{i-2}$$
, (23)

where

$$\epsilon = 0.7$$
 $A_3 = 8.275 839$
 $A_1 = 6.636 737$
 $A_4 = -19.926 887$
 $A_5 = 51.208 621$

Table 15 gives comparisons of $\rm C_v$ and $\rm C_p$ data of Ernst [26], Goodwin [34], and Yesavage [104,105] with calculated values.

4.2 Sound Velocities

Table 16 gives comparisons of velocity of sound data with calculated values for the saturated liquid results of Rao [72] and of Younglove [107], and for the single-phase measurements of Lacam [60] and of Younglove [107]. The differences approaching 6 percent at low temperatures have required a careful scrutiny of the calculated derivatives used in the computation of the sound velocity. The calculated values of $(\partial P/\partial p)$ in table 18 agree well with plots of Haynes [42] isotherms at low temperatures, and the calculated values of $(\partial P/\partial T)$ in table 17 agree with plots of the Ely and Kobayashi [25] isochores. The uncertainty of up to 3 percent in the $C_V(p,T)$ data in table 15 thus corresponds to an estimated maximum uncertainty of about 2 percent in the calculated speeds of sound at low temperatures. For saturated liquid, the present calculated values fall between those of Rao [72] and Younglove [107].

5. Tables of Physical and Thermodynamic Properties

5.1 Calculated P-p-T Isochores and Isotherms

Tables 17 and 18 give a selection of isochores and isotherms computed by equation of state (6). These are essential to examine behavior of the $P(\rho,T)$ surface. They are a useful supplement to the isobars of table 21 for interpolating $P-\rho-T$ values and their derivatives.

The tables of isochores show that the isochore curvatures are qualitatively consistent with a maximum in the specific heat $C_{\rm V}(\rho,T)$ at the critical point. The isotherm tables show that $\partial P/\partial \rho$ is nonnegative and that pressure increases monotonically with density along isotherms.

5.2 The Joule-Thomson Inversion Locus

Table 19 gives the P-p-T locus of the JT inversion, $(\partial T/\partial P)_H = 0$, obtained from equation of state (6) under the condition $T \cdot (\partial P/\partial T) = \rho \cdot (\partial P/\partial \rho)$. This table has been computed to temperatures well above those of P-p-T data, to show approach to a maximum in P-T coordinates.

5.3 Thermophysical Properties of the Saturated Liquid

Table 20 gives physical and thermodynamic properties of the saturated liquid computed by methods of section 3. (Properties of the saturated vapor can be obtained from Table 21 from values given at the coexistence boundary for each isobar.)

5.4 Thermophysical Properties Along Selected Isobars

Table 21 gives physical and thermodynamic properties on isobars, computed by methods of section 3. These tables are extrapolated above the maximum temperature and pressure of P-p-T data used for adjusting the equation of state. Small discontinuities may be detected at $T_c = 369.85$ K along isobars at $P > P_c = 4.24746$ MPa due to a change in the paths of computation (section 3).

The first line of each table refers to freezing liquid on the P(T) melting line. Each table at $P < P_C$ contains a blank line for the transition from saturated liquid to vapor, as seen by the abrupt decrease of density. Dielectric constants are extrapolated above maximum experimental temperatures and pressures (see section 2.10 and table 13).

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APPENDIX A. Symbols and Units

```
Subscripts c and t refer to critical and liquid triple points.
Subscripts g and l refer to saturated vapor and liquid.
Subscript or refers to liquid-vapor coexistence (usually the liquid),
Subscript r refers to reduced parameter.
Subscript o refers to reference state property.
Subscript m refers to melting line.
Subscript b refers to normal boiling point.
Superscript o refers to ideal gas state property.
expt refers to experimental value.
calc refers to calculated value.
(T6/96)
                isochore derivative, MPa/K
                isotherm derivative, MPa·m<sup>3</sup>/kg
( aP/ap)_T
            isochore curvature, MPa/K<sup>2</sup>
(3^2P/3T^2)_0
\alpha, \beta, \gamma, n
                nonlinear parameters in the equation of state
a,b,c,d,e,f coefficients defined in various equations
                Z<sub>c</sub> - 1 in saturated vapor density equation
A_{0}
                 coefficients defined in various equations
Ai
                 (1 - \beta) + (1 - \beta)^{1/2} in equation of state
h
                 density-dependent coefficients in the equation of state
B(\rho), C(\rho)
                 second and third virial coefficients
B(T),C(T)
                reduced second and third virial coefficients
B_{r}(T), C_{r}(T)
                 exponent in Simon equation
C_{V}(\rho,T)
                 molal heat capacity at constant volume, J/(mol·K)
C_{p}(\rho,T)
                 molal heat capacity at constant pressure, J/(mol·K)
                 molal heat capacity for saturated liquid, J/(mol·K)
C_{\alpha}(T)
CMF
                 Clausius-Mossotti function, cm<sup>3</sup>/mol
E(\rho,T)
                 the internal energy, J/mol
E<sub>0</sub>
                 21,888.910 J/mol (arbitrary)
                 exponent in various equations
ε
                 dielectric constant
3
f/P
                 fugacity/pressure ratio
f(\rho)
                 used in definition of \Theta(\rho)
f(x)
                 defined in saturated vapor density equation
F(\rho,T)
                 defined in the equation of state
F(Z)
                 defined in the saturated vapor density equation
H_0^0
                 enthalpy for ideal gas state at T = 0
```

APPENDIX A. (Continued)

	AFFENDIX A. (Concinded)
H(ρ,Τ)	the enthalpy, J/mol
J	the joule, 1 N·m
JT	Joule-Thomson
L	the liter, 10^{-3} m ³
mol	44.09721 grams of propane ($C^{12} = 12$ scale)
$\omega(\rho,T)$	defined in the equation of state
Р	pressure, MPa
Pm	melting pressure, MPa
$P_{\sigma}(T)$	the vapor pressure, MPa
P _σ (ρ)	$P_{\sigma}[T_{\sigma}(\rho)]$, vapor pressure as a function of density
п(Т)	$P_{\sigma}(T)/P_{c}$
Φ(ρ,T)	function in the equation of state
Ψ(ρ,Τ)	function in the equation of state
Q _{vap}	ΔH _{vap} , the heat of vaporization, J/mol
_R (1)	the gas constant, 8.3145 J/(mol°K), 0.0083145 MPa°L/(mol°K)
*	0.0083145°ρc, MPa/K
ρ	density, kg/m ³
Pr	ρ/ρ_{C} , density reduced at the critical point
ρ _{r,t}	$ ho/ ho_{ extsf{t}}$, density reduced at the triple point
S(p,T)	the entropy, J/(mol·K)
T	temperature, K
To	constant
$T_{\sigma}(\rho)$	liquid-vapor coexistence temperature, K
Θ(ρ)	defined locus of temperatures
u(T)	defined in various equations
٧	1/ρ, molar volume, m ³ /kg
W(p,T)	the velocity of sound, m/s
x(T)	T/T_C for the equation of state
x(T)	variously defined for other equations
x _σ (ρ)	$T_{\sigma}(\rho)/T_{C},$ reduced temperature at coexistence for the equation of state
У	defined in various equations
Z	compressibility factor

⁽¹⁾ The gas constant is increased slightly in value from earlier work in view of the recent report of Rowlinson and Tildesley [78].

APPENDIX B. Conversion of Units

In the following table the molecular weight of propane is given by mol. wt. \equiv 44.09721 g/mol. Also, 1 cal $_{th}$ = 1 cal (thermochemical) = 4.184 J and 1 BTU $_{IT}$ = 1 BTU (International Table) = 1055.056 J.

To convert from	То	Multiply by
Pressure, MPa	bar	10.
	atm	9.86923
	kg/cm ²	10.1972
	lb/in ²	145.038
Volume, m ³	liter (L)	1000.
	ft ³	35.3147
Density, kg/m ³	g/cm ³	0.001
	mol/L	1./(mol. wt.)
	lb/ft ³	0.062428
Molar energy, J/mol	MPa·m ³ /kg	0.001/(mol. wt.)
	bar•L/mol	0.01
	cal _{th} /mol	0.239006
	BTU _{IT} /1b	0.429923/(mol. wt.)
Molar entropy, J/(mol·K)	BTU _{IT} /(1b.°F)	0.238846/(mol. wt.)

APPENDIX C. Fixed-Point Values for Propane

Critical Point

 $P_{c} = 4.24746 \text{ MPa}$

 $\rho_{c} = 220.5 \text{ kg/m}^{3} (5.00 \text{ mol/L})$

 $T_{c} = 369.85 \text{ K}$

Normal Boiling Point

P = 0.101325 MPa

T = 231.068 K

 $\rho_{V} = 2.416 \text{ kg/m}^{3} (0.05478 \text{ mol/L})$

 $\rho_{\ell} = 581.04 \text{ kg/m}^3 (13.176 \text{ mol/L})$

Triple Point

 $P_{t} = 1.6895 \times 10^{-10} MPa$

 $T_{t} = 85.47 \text{ K}$

 $\rho_{V} = 1.0484 \times 10^{-8} \text{ kg/m}^{3} (2.3775 \times 10^{-10} \text{ mol/L})$

 $\rho_{\ell} = 733.34 \text{ kg/m}^3 (16.630 \text{ mol/L})$

APPENDIX D. Propane Properties Reference Index

APPENDIX D.	Propane Properties Refer	ence Index
Melting Line	Date	Pressure Range, MPa
Reeves [74]	1964	200 - 1000
Babb [1]	1970	75 - 1050
Vapor Pressures	Date	Temperature Range, K
Burrell [8]	1916	149 - 229
Maass [63]	1921	230 - 250
Dana [19]	1926	210 - 323
Sage [81]	1934	294 - 369
Beattie [3]	1935	323 - 348
Kemp [53]	1938	166 - 231
Deschner [22]	1940	302 - T _C
Gilliland [29]	1940	315 - 358
Cherney [14]	1949	303 - 323
Reamer [73]	1949	313 - T _C
Tickner [97]	1951	105 - 165
Clegg [15]	1955	323 - T _C
Helgeson [46]	1967	278 - 361
Carruth [11,12]	1973	95 - 179
Mousa [66]	1977	335 - T _C
Teichmann [94]	1978	325 - 363
Kratzke [57]	1980	312 - 368
Thomas [95]	1982	258 - T _C
Thermal loops (This report)	1982	T _t - 230
		·
Saturated Liquid Densities	Date	Temperature Range, K
Maass [63]	1921	195 - 249
Dana [19]	1926	273 - 329
Sage [81]	1934	294 - 369
Van der Vet [100]	, 1937	283 - 323
Deschner [22]	1940	303 - T _C
Carney [10]	1942	228 - 333
NGAA [67]	1942	227 - 333
Reamer [73]	1949	313 - T _C
Clegg [15]	1955	323 - T _C

APPENDIX D. (Continued)

APPENDIX D.	(Continued)	
Saturated Liquid Densities	Date	Temperature Range, K
Francis [28]	1957	293
Seeman [85]	1963	278 - 299
Helgeson [46]	1967	278 - 361
Klosek [56]	1968	89 - 133
Shana'a [87]	1968	108
Jensen [48]	1969	93 - 133
Sliwinski [88]	1969	283 - 369
Tomlinson [98]	1971	278 - 313
Kahre [50]	1973	278 - 328
Rodosevich [75]	1973	91 - 115
McClune [64]	1976	93 - 173
Haynes [44]	1977	100 - 289
Ely [25]	1978	166 - 288
Orrit [68]	1978	87 - 244
Thomas [95]	1982	258 - 369
Saturated Vapor Densities	Date	Temperature Range, K
Dana [19]	1926	290 - 323
Sage [81]	1934	294 - 369
Deschner [22]	1940	303 - T _C
Reamer [73]	1949	313 - T _C
Clegg [15]	1955	323 - T _C
Helgeson [46]	1967	278 - 361
Sliwinski [88]	1969	283 - 369
Thomas [95]	1982	323 - 369
Virial/vapor pressure equations (This report)	1982	90 - 330
Virial Coefficients	Date	Temperature Range, K
Sage [81]	1934	294 - 377
Beattie [2]	1937	370 - 548
Jessen [49]	1938	273 - 323
Deschner [22]	1940	303 - 609
Cherney [14]	1949	323 - 398
Reamer [73]	1949	311 - 511

	APPENDIX D.	(Continued)	
Virial Coefficients		Date	Temperature Range, K
Bottomley [5]		1950	295
Kretschmer [58]		1951	303
Gunn [39]		1958	311 - 510
Dawson [21]		1960	243 - 348
McGlashan [65]		1962	295 - 413
Kapallo [52]	*	1963	244 - 321
Brewer [6]		1967	248 - 298
Strein [93]		1970	296 - 493
Hahn [40]		1974	211 - 493
Warowny [102]		1978	373 - 423
Thomas [95]		1982	323 - 623
Compressibility Data	Date	Range of T, K	Range of P, MPa
Sage [81]	1934	294 - 378	0.17 - 20.7
Beattie [2]	1937	369 - 548	2.4 - 31.0
Burgoyne [7]	1940	243 - 293	0.5 - 6.0
Deschner [22]	1940	303 - 609	0.1 - 14.2
Cherney [14]	1949	323 - 398	1.1 - 5.0
Reamer [73]	1949	311 - 511	0.1 - 69.0
Dawson [21]	1960	243 - 348	0.05 - 0.18
Dittmar [23]	1962	273 - 413	1.0 - 103.5
Kahre [51]	1964	233 - 350	0.9 - 9.8
Huang [47]	1966	173 - 273	7.0 - 35.0
Tomlinson [98]	1971	278 - 328	1.06 - 13.8
Ely [25]	1978	166 - 324	0.26 - 42.8
Teichmann [94]	1978	323 - 573	2.77 - 60.9
Warowny [102]	1978	373 - 423	0.3 - 6.3
Haynes [42]	1982	90 - 300	0.6 - 37.5
Thomas [95]	1982	258 - 623	0.6 - 40.0
Virial equation (This report)	1982	270 - 600	0.4 - 1.0

	APPENDIX D.	(Continued)	
Specific Heats	Date	Туре	Range of T, K
Dana [19]	1926	$C_{\sigma}(T)$	242 - 292
Sage [80]	1935	Cp(T)	294 - 444
Beeck [4]	1936	$C_{p}^{o}(T)$	273 - 573
Sage [82]	1937	C _p (T)	294 - 444
Kemp [53]	1938	$C_{\sigma}(T)$	90 - 230
Kistiakowsky, Lacher [54]	1940	Cp(T)	148 - 258
Kistiakowsky, Rice [55]	1940	Cp(T)	272 - 369
Dailey [18]	1943	Cp(T)	335 - 693
Rossini [76]	1947	C _p (T)	339 - 422
API 44 [110]	1952	Cp(T)	100 - 1000
Cutler [17]	1965	$C_{\sigma}(T)$	91 - 105
Yesavage [104,105]	1969	$C_p(T,P)$	116 - 422
Ernst [26]	1970	$C_{p}(T,P)$	293 - 353
Chao [13]	1973	$C_{p}^{o}(T)$	Spectroscopic
Goodwin [34]	1978	$C_{\sigma}(T)$	86 - 360
Goodwin [34]	1978	$C_{V}(T,\rho)$	90 - 337
Heats of Vaporization		Date	Temperature Range, K
Dana [19]		1926	234 - 293
Kemp [53]		1938	231
Sage [79]		1939	313 - 348
Staveley [91]		1950	185 - 213
Helgeson [46]		1967	311 - 330
Yesavage [104,105]		1969	231 - 367
Carruth [11]		1970	111 - 237
Thermal loops (This report))	1982	T _t - 230
Clapeyron equation (This ro	eport)	1982	90 - 360
Sound Velocities		Date	Temperature Range, K
Lacam [60]		1956	298 - 498
Rao [72]		1971	140 - 230
Younglove [107]		1981	90 - 300

APPEN	ntx	D.	(Cor	ntin	ued)
AFFLIN	ハエソ	U o	LUUI	16 111	ueu

Dielectric Constants	Date	Temperature Range, K
Sliwinski [89]	1969	293 - 370
Pan [69]	1975	91 - 115
Thompson [96]	1980	228 - 230
Luo [62]	1981	220 - 289
Haynes [42,45]	1982	90 - 300

APPENDIX E. Computer Program

```
PROGRAM PRTHRMB (INPUT, OUTPUT)
     REVISION OF PROPANE THERMOFUNCTIONS, RDG/NBS, START JAN. 26, 1981.
C
      COMMON GK,GKK, B1,B2,B3,B4,B5, C1,C2,C3, E1,E2,E3, ER, IX
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      COMMON/4/XB1, XB2, XC1, XC2, XE1, XE2, DXBDR, DXCDR, DXEDR
      COMMON/6/ TSAT. THETA. PSAT
      COMMON/8/ IN, IK, P, T, DEN, E, H, S, CV, CP, CSAT, W, WK COMMON/9/ DNG, EG, HG, SG, CVG, CPG, WG, DPGDT, DPGDD
      COMMON/11/ DELS, DELCV
      COMMON/12/ZCRT, ZCALC, DZDT, ZSAT, DZSDT, ZFX, FRT, DFRTDT
      COMMON/21/ TPS(70)
      COMMON/95/ PIS, DIS, DPTIS, DPDIS
      COMMON/99/ TI, EZZ, EZ, SZ, CVZ, HZ, CPZ
      DIMENSION HZA(70), SZA(70), PP(99)
      DATA(WM=44.09721), (PA=1.01325), (GJ=8.3145)
     NOTE MOL. WT. HERE IS FOR PROPANE.
C
    1 FORMAT(I5, 2F10.0)
    2 FORMAT(15, 3F10.0)
    3 FORMAT(8110)
    5 FORMAT(1X)
    9 FORMAT(8F10.0)
   14 FORMAT(1H1 13X * PROPANE ISOBAR AT P =* F10.6, 4H MPA / )
   16 FORMAT( 9X1HT 8X3HDEN 9X3HDEN 8X1HZ 5X5HDP/DT 5X5HDP/DD
     2 8X1HE 8X1HH 8X1HS 6X2HCV 6X2HCP 9X3HF/P 5X1HW 4X5HDIEL. /
       9X1HK 6X5HMOL/L 7X5HKG/M3 9X 5X5HMPA/K 1X9HMPA-M3/KG
     4 4X5HJ/MOL 4X5HJ/MOL 2X7HJ/MOL/K 1X7HJ/MOL/K 1X7HJ/MOL/K
     5 12X 1X5HM/SEC 4X5HCONST )
   17 FORMAT(1X F9.3, E11.4, E12.5, F9.5, F10.6, F10.5,
     1 2F9.1, F9.3, 2F8.2, E12.5, I6, F9.5)
   20 FORMAT(1H116X*TEST IDEAL FNCTNS*/17X 3HT,K 7X3HHZA 7X3HSZA )
   21 FORMAT(10X F10.2, F10.1, F10.3)
   80 CALL PYTDATA
      CALL PEEK
                       CALL ISOTHRM
                  $
     COMPUTE THERMOFUNCTIONS ON ISOBARS. START ON THE MELTING LINE.
     NOTE, ISOBAR P=PCRT OK, BUT ISOTHERM T=TCRT IS EXCLUDED.
C
     ISOBARS AT P UNDER PCRT TRAVERSE THE DOME.
     NOTE USE OF QVAP ,DATA, TO CROSS THE ,DOME,.
NOTE USE OF CSAT ,DATA, FOR SPECIFIC HEATS IN COMPRESSED LIQUID.
C
C
     NOTE TPS(IK) USED BY COMPRES.
     GET FUGACITIES, F/P, VIA H,S, HZ(T),SZ(T). (J.F.ELY).
     SAVE HZA(70), SZA(70) FROM 90 THRU 700 K.
   85 DO 86 J=9.70 $ TI = 10*J $ CALL IDEAL $ HZA(J) = HZ
   86 SZA(J) = SZ
   87 PRINT 20 $ DO 88 J=9.70 $ T = 10*J
   88 PRINT 21, T, HZA(J), SZA(J)
                    $ CALL TABLIO
   89 CALL JTLOCUS
   90 IN = 1 $ NI = 57 $ READ 9, (PP(I), I=1, NI)
   91 DO 300 I=IN,NI $ IK = I $ LS = 0
   92 P = PP(I) $ IF(I.EQ.28) P = PCRT
   93 PK = P/10 $ PRINT 14. PK $ PRINT 16
  100 T = FINDTMF(P) $ CALL COMPRLO $ V=1/DEN $ IW=W
```

```
101 Z = P/DEN/GKK/T    DIE = DIELF(DEN, T, P)
102 TI = T $ CALL IDEAL $ GIB = H-EZZ-HZ - T*(S-SZ)
103 XP = EXP(GIB/GJ/T) $ FOP = XP*PA/P $ CALL CON
104 PRINT 17, T,DEN,DIS,Z, DPTIS,DPDIS, E,H,S,CV,CP, FOP,IW,DIE
105 \text{ IT} = T/10 \$ \text{ IF(P.LT.PCRT)} 110,180
   CASES FOR P LESS THAN PCRT.
110 TPS(IK) = TS = FINDTSF(P)
                                S K = L = 0
111 DO 150 J=1,99 $ T = JT = 10*(IT+J)
112 IF(T.LT.TS) 113,117
113 CALL COMPRES $ V = 1/DEN $ IW = W
114 Z = P/DEN/GKK/T $ DIE = DIELF(DEN,T,P)
    M = JT/10 $ GIB = H - EZZ - HZA(M) - T*(S - SZA(M))
    XP = EXP(GIB/GJ/T) $ FOP = XP*PA/P $ CALL CON
115 PRINT 17, T.DEN, DIS, Z. DPTIS, DPDIS, E, H, S, CV, CP, FOP, IW, DIE
116 GO TO 150
117 LS = LS + 1  $ IF(LS.E0.1) 120.130
   CASE FOR SATURATED LIQUID AND VAPOR.
120 T = TS $ CALL COEXIST $ V=1/DEN $ VG=1/DNG $ IW=W $ IWG=WG
121 Z = P/DEN/GKK/T $ ZG = P/DNG/GKK/T
122 DIEL = DIELF(DEN,T,P) $ DIEG = DIELF(DNG,T,P)
123 TI = T $ CALL IDEAL $ GIB = H-EZZ-HZ - T*(S-SZ)
124 \text{ FOP} = \text{EXP}(\text{GIB/GJ/T})*\text{PA/P}  $ CALL CON
125 PRINT 17, T,DEN,DIS,Z, DPTIS,DPDIS, E,H,S,CV,CP, FOP,IW,DIEL
126 PRINT 5 $ DIS=DNG*WM $ DPTIS=DPGDT/10 $ DPDIS = DPGDD/10/WM
127 PRINT 17. T.DNG.DIS.ZG.DPTIS.DPDIS.EG.HG.SG.CVG.CPG.FOP.IWG.DIEG
128 T = JT
   CASES FOR THE HOMOGENEOUS DOMAIN.
130 IF(JT.GT.500) 131.132
131 K = K+1 \$ T = JT = JT + 10*K \$ IF(JT.GT.700) 300,132
132 CALL GENIUS $ V=1/DEN $ IW=W $ Z = P/DEN/GKK/T
133 IF(T.GT.450) 134.135
134 DIE = 0 $ GO TO 136
135 DIE = DIELF(DEN,T,P)
136 M = JT/10 \$ GIB = H-EZZ-HZA(M) - T*(S-SZA(M))
137 XP = EXP(GIB/GJ/T) $ FOP = XP*PA/P $ CALL CON
141 PRINT 17, T,DEN,DIS,Z, DPTIS,DPDIS, E,H,S,CV,CP, FOP,IW,DIE
150 CONTINUE
   FOR P.GE.PCRT, CASES FOR T.LT.OR.T.GT.TCRT.
180 TPS(IK) = TCRT * K = L = 0
181 DO 250 J=1.99 T = JT = 10*(IT+J)
182 IF(T.LT.TCRT) 190,210
   CASE A FOR T LESS THAN TCRT.
190 CALL COMPRES $ V = 1/DEN $ IW = W
191 Z = P/DEN/GKK/T $ DIE = DIELF(DEN.T.P)
192 \text{ M} = JT/10 \text{ } \text{GIB} = H-EZZ-HZA(M) - T*(S-SZA(M))
193 XP = EXP(GIB/GJ/T) $ FOP = XP*PA/P $ CALL CON
194 PRINT 17, T,DEN,DIS,Z, DPTIS,DPDIS, E,H,S,CV,CP, FOP,IW,DIE
195 GO TO 250
   CASE FOR T ABOVE TCRT, HOMOGENEOUS DOMAIN.
210 IF(JT.GT.500) 211,220
211 K = K+1 T = JT = JT + 10*K $ IF(JT.GT.700) 300.220
220 CALL GENIUS $ V=1/DEN $ IW=W $ Z = P/DEN/GKK/T
221 IF(T.GT.450) 222,223
222 DIE = 0 $ GO TO 224
```

```
223 DIE = DIELF(DEN.T.P)
  224 M = JT/10 $ GIB = H-EZZ-HZA(M) - T*(S-SZA(M))
  225 XP = EXP(GIB/GJ/T) $ FOP = XP*PA/P $ CALL CON
  226 PRINT 17, T,DEN,DIS,Z, DPTIS,DPDIS, E,H,S,CV,CP, FOP,IW,DIE
  250 CONTINUE
  300 CONTINUE
  999 STOP $
                  END
      SUBROUTINE COEXIST
     GIVEN T AT COEXISTENCE, GET BOTH VAPOR AND LIQUID FUNCTIONS.
C
C
     FOR VAPOR, GET DNG, EG, HG, SG, CVG, CPG, WG, DPGDT, DPGDD, -
C
     FOR LIQUID, GET DEN, E, H, S, CV, CP, CSAT, W. DPDT, DPDD.
     COEXIST CALLED BY COMPRLQ. P NOT USED, MUST NOT CHANGE.
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      COMMON/8/ IN, IK, P, T, DEN, E, H, S, CV, CP, CSAT, W, WK
      COMMON/9/DNG, EG, HG, SG, CVG, CPG, WG, DPGDT, DPGDD
      COMMON/11/ DELS, DELCY
      COMMON/99/ TI, EZZ, EZ, SZ, CVZ, HZ, CPZ
      DATA (Q=1.01325), (G=0.083145)
    1 FORMAT(1HO 9X *T EXCEEDS TORT IN COEXIST. * / )
    2 IF(T.GT.TCRT) 3,4
    3 PRINT 1 $ STOP
    4 PS = PSATF(T) $ DNG = DB = DENGASF(T)
    5 TI = T $ CALL IDEAL $ M = 15 $ DA = L = 0
    6 EG = EZZ + EZ + EDELF(L,M,T,DA,DB) $ HG = EG + 100*PS/DB
    7 \text{ SG} = \text{SZ} + \text{DELS} - 100 \times \text{G} \times \text{ALOG} (\text{G} \times \text{T} \times \text{DB} / 0)
    8 IF(T.EQ.TCRT) 9,11
    9 PX = PVTF(T,DB,1) $ DPGDT = DPDT $ DPGDD = DPDD
   10 CPG = CVG = WG = 0 $ GO TO 15
   11 CVG = CVZ + DELCV $ PX = PVTF(T,DB,1)
   12 CPG = CVG + 100*T/DPDD*(DPDT/DB)**2 $ WG = SQRT(WK*CPG*DPDD/CVG)
   13 DPGDT = DPDT $ DPGDD = DPDD
    NOW TRAVERSE THE ,DOME, USING QVAP ,DATA,.
   15 DEN = DL = DENLIOF(T) $ DDLDT = DDSDT $ OV = OVAPXF(T)
   16 H = HG - QV  $ S = SG - QV/T $ E = H - 100 \times PS/DL
     THIS RETURN AT 16+ USED ONLY WHEN CALLING SSATFIT, HSATFIT.
   17 IF(T.EQ.TCRT) 18,19
   18 PX = PVTF(T,DL,1) $ CP=CV=CSAT=W=0 $ RETURN
   19 CSAT = CSATXF(T) PX = PVTF(T,DL,1)
   22 CV = CSAT + 100*T*DPDT*DDLDT/DL/DL
   23 CP = CV + 100*T/DPDD*(DPDT/DL)**2
   30 W = SORT(WK*CP*DPDD/CV) $ RETURN $
                                                END
      SUBROUTINE COMPRES
C
     SAVES COMPUTER TIME INTEGRATING COMPRLIQ AT T.LT.TCRT.
C
     FOR T = INTEGER MULTIPLES OF 10 K. FIRST ISOBAR USES COMPRLQ.
C
     FOR SUCCEEDING ISOBARS, START ON PREVIOUS ISOBAR, EXCEPT -
     AT TEMPS GE TPS(IK-1) ON PREVIOUS ISOBAR, MUST USE COMPRLQ.
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      COMMON/8/ IN, IK, P, T, DEN, E, H, S, CV, CP, CSAT, W, WK
```

```
COMMON/11/ DELS, DELCV
      COMMON/21/ TPS(70)
      DIMENSION DK(50).EK(50).SK(50).CK(50)
    1 FORMAT(1HO 9X *T G.E. TCRT IN COMPRES. * / )
    2 IF (T.GE.TCRT) 3.4
    3 PRINT 1 $ STOP
    4 J = T/10  $ IF(T - 10*J) 5.6
    5 CALL COMPRLO $
                         RETURN
    6 IF(IK.EO.IN) 7.9
    7 CALL COMPRLO
    8 DK(J)=DEN $ EK(J)=E $ SK(J)=S $ CK(J)=CV $ RETURN
    INTEGRATE FROM OLD DEN TO NEW DEN ON GIVEN ISOTHERM -
     EXCEPT IF T EXCEEDS OLD TMAX, USE COMPRLQ.
    9 IF(T.GE.TPS(IK-1)) GO TO 7
   10 DA=DK(J) \$ DK(J) = DEN = DB = FINDENF(T,P) \$ N = 13
   11 EK(J) = E = EK(J) + EDELF(1, N, T, DA, DB) $ H = E + 100*P/DB
   12 SK(J) = S = SK(J) + DELS $ CK(J) = CV = CK(J) + DELCV
    GET NEW DP/DT, DP/DD, CP, W.
   15 PX = PVTF(T,DB,1) $ CP = CV + 100*T/DPDD*(DPDT/DB)**2
   30 W = SORT(WK*CP*DPDD/CV) $ RETURN $ END
      SUBROUTINE COMPRLO
C
     GIVEN P,T FOR COMPR.LIQ. AT T.LT.TC, GET DEN AND FUNCTIONS.
     REVISED TO USE HSATF, SSATF, CSATXF, BUT NOT COEXIST. TIMESAVER.
     INTEGRATE ALONG ISOTHERM T FROM SATLIO UP TO POINT (P.T).
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT.D2PDT2.DPSDT.DPMDT.DPDD.DPDR.DTSDR.DTHDR.DDSDT
      COMMON/8/ IN, IK, P, T, DEN, E, H, S, CV, CP, CSAT, W, WK
      COMMON/11/ DELS, DELCV
    1 FORMAT(1HO 9X *T NOT UNDER TORT IN COMPRLO.*/)
    2 IF(T.GE.TCRT) 3.4
    3 PRINT 1 $ STOP
C
    GET PSAT, DENLIQ, AND SATLIQ FUNCTIONS FOR START.
    4 PS = PSATF(T) $ DL = DENLIOF(T) $ DDLDT = DDSDT
    6 HS = HSATF(T) $ ES = HS - 100*PS/DL $ SS = SSATF(T)
   7 IF(T.GT.340) 8,9
C
    8 \text{ CVS} = \text{CVSATF}(T) $ GO TO 10
    9 PX=PVTF(T,DL,0) $ CVS = CSATXF(T) + 100*T*DPDT*DDLDT/DL/DL
    INTEGRATE UP TO POINT (P.T).
   10 DB = FINDENF(T,P) \Rightarrow DX = DB - DL \Rightarrow IF(DX.GT.0) 11,20
   11 M = 14    E = ES + EDELF(1, M, T, DL, DB)
   12 H = E + 100*P/DB  $ S = SS + DELS $ CV = CVS + DELCV
   13 PX = PVTF(T,DB,1) $ CP = CV + 100*T/DPDD*(DPDT/DB)**2
   14 \text{ W} = \text{SQRT}(\text{WK*CP*DPDD/CV}) \text{ DEN = DB } \text{ RETURN}
   20 DEN=DL $ E=ES $ H=HS $ S=SS $ CV=CVS $ PX = PVTF(T,DL,1)
   21 CP = CV + 100*T/DPDD*(DPDT/DL)**2 $ W = SQRT(WK*CP*DPDD/CV)
   30 RETURN $
                   END
```

SUBROUTINE CON

C CONVERT TO SI UNITS FOR P, DEN, DP/DT, DP/DD, COMMON/3/DPDT,D2PDT2, DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT COMMON/8/IN,IK, P,T,DEN, E,H,S, CV,CP,CSAT, W,WK

```
COMMON/95/ PIS, DIS, DPTIS, DPDIS
      DATA (WM = 44.09721)
    1 PIS = P/10 $ DIS = DEN*WM
    2 DPTIS = DPDT/10 $ DPDIS = DPDD/10/WM
    9 RETURN $ END
      FUNCTION CSATXF(T)
C
     PROPANE, J/MOL/K, RDG, NBS J. RES. 83(5), 449, (1978).
C
     COEFFS. ADJUSTED FOR NEW TCRT = 369.85.
     CS = A1*X/(1-X)**E + A2 + A3*X + A4*X2 + A5*X3.
      DIMENSION A(5)
      DATA (E=0.7), (TCRT=369.85)
      DATA(A = 6.636737, 80.76732, 8.275839, -19.926887, 51.208621)
    1 FORMAT(1HO 9X *CSATXF, T.GT.TCRT. * / )
    2 IF(TCRT-T) 3,4,5
    3 PRINT 1 $ STOP
    4 CSATXF = 0 $ RETURN
    6 \text{ CS} = \text{CS} + \text{A(K)}*X**(K-2) $ CSATXF = CS $ RETURN $ END
      FUNCTION CUBERT(X)
     CUBE ROOT MISSING FROM 6600 COMPUTER LIBRARY.
    1 E = 1.0/3.0 $ IF(X) 2,3,4
    2 \text{ CUBERT} = -ABS(X)**E $
    3 CUBERT = 0.0 $ RETURN
    4 CUBERT = X**E $ RETURN $ END
      FUNCTION DELTAF(T,D)
     GET (T*DP/DT - D*DP/DD) FOR THE J-T INVERSION CURVE.
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT.D2PDT2.DPSDT.DPMDT.DPDD.DPDR.DTSDR.DTHDR.DDSDT
    1 IF(T-TCRT) 2,4,4
    2 DL = DENLIQF(T) $ IF(D-DL) 3,3,4
    3 DELTAF = 1.0E+100 $ RETURN
    4 P = PVTF(T_0, D_0, 1)
    5 DELTAF = ABS (T*DPDT-D*DPDD) $ RETURN $ END
      FUNCTION DENGASF(T)
     PROPANE SAT. VAPOR DEN, MOL/L, (DCRT=5.00), RDG, FEB. 19, 1981.
     DESIGNED FOR ZSAT = 1 AT LOW DENSITIES, 5/29/77.
C
C
     USE ZSAT # PS/DS/GK/TS WITH VAPOR PRESSURES, AND ZCRT.
     Z = 1 + (ZCRT-1)*PI*F(X)/X/X, X # T/TCRT, AND - F(X) = 1 + UE*(A1 + A2*X + A3*X2 + . . ), U = (1-X).
C
      COMMON/1/AL,BE,GA,DE,EP,ET, DCRT,TCRT,PCRT, DGAT,DTRP,TTRP,PTRP
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      COMMON/12/ZCRT, ZCALC, DZDT, ZSAT, DZSDT, ZFX, FRT, DFRTDT
      DIMENSION AV(4)
      DATA (GKK = 0.083145)
      DATA (EG=0.35), (NFG=4)
      DATA(AV = 5.43973368, -20.0297592, 23.8710761, -10.1051069)
```

```
1 FORMAT(1HO 9X *T EXCEEDS TO IN DENGASF. * / )
   2 IF(TCRT-T) 3,4,5
   3 PRINT 1 $ STOP
   4 DENGASF = DCRT $ ZFX = 1 $ DDSDT = 1.0E+100 $ RETURN
   5 \text{ ZN} = \text{ZCRT-1} $ PC = PCRT $ P = PSATF(T)
   5 PI = P/PC $ PIT = DPSDT/PC $ TC = TCRT
   7 \times = T/TC    \times 2 = X \times X    \times U = 1 - X    \times UE = U \times EG    \times UE1 = -EG \times UE/U 
   8 Y = Y1 = 0 $ DO 10 K=1.NFG $ L = K-1 $ XL = X**L
   9 Y = Y + AV(K)*XL $ Y1 = Y1 + AV(K)*L*XL/X
   10 CONTINUE \$ ZFX = F = 1 + UE*Y \$ F1 = UE*Y1 + UE1*Y
  15 ZCALC = ZSAT = Z = 1 + ZN*PI*F/X2
  16 DZSDT = DZDT = (PI*(F1-2*F/X)/TC + F*PIT)*ZN/X2
  17 DENGASF = P/T/Z/GKK
  18 DDSDT = (DPSDT - P/T - P*DZDT/Z)/T/Z/GKK $ RETURN $ END
     FUNCTION DENLIOF(T)
    PROPANE SAT.LIQUID DEN, MOL/L, (DCRT=5.00), RDG, FEB. 19, 1981.
C
C
    DEN = DCRT + YNL*(X + (XE-X)*Y),
                                      YNL # DTRP - DCRT.
    Y # A1 + A2*X + A3*X2 + A4*X3.
     COMMON/3/DPDT.D2PDT2.DPSDT.DPMDT.DPDD.DPDR.DTSDR.DTHDR.DDSDT
     DIMENSION AW(3)
     DATA (EL=0.35) (NFL=3)
     DATA (TTRP=85.47).(TCRT=369.85).(DCRT=5.00).(DTRP=16.63)
     DATA(AW = 0.764389673, 0.009457047, -0.115001817)
   1 FORMAT(1HO 9X *DENLIOF = 0. T EXCEEDS TCRT. * / )
   2 IF(TCRT-T) 3,4,5
   3 PRINT 1 $ STOP
   4 DENLIOF = DCRT $ DDSDT = -1.0E+10 $ RETURN
   5 XN=TCRT-TTRP $ X=(TCRT-T)/XN $ X2 = X*X $ DXDT = -1.0/XN
   6 XE = X**EL    V = XE - X    V1 = EL*XE/X - 1
   7 Y1 = Y = 0 $ DO 9 K=1, NFL $ L = K-1 $ XL = X**L
   9 CONTINUE $ YNL = DTRP - DCRT
  11 DENLIOF = DCRT + YNL*(X + U*Y)
  12 DDSDT = YNL*(1 + U*Y1 + U1*Y)*DXDT $ RETURN $ END
     FUNCTION DIELF(D,T,P)
    PROPANE CONSTS., RDG, MARCH 23, 1981. VIA HAYNES DATA.
C
C
    CM,RMSPCT = 0.048, E,RMSPCT = 0.018.
    CM = A1 + A2*R + A3*R2 + A4*LN(1+B/X) + A5*PI.
     DIMENSION A(5)
     DATA (B=1.0), (DCRT=5.00), (TCRT=369.85)
     DATA(A = 15.562631, 0.38581410, -0.15099771,
    1 0.51074051, -0.0045141181)
   2 \text{ CM} = A(1) + A(2)*R + A(3)*R*R + A(4)*G + A(5)*PI
   3 Z = CM*D/1000  S DIELF = (2*Z+1)/(1.0-Z)
   5 RETURN $ END
     FUNCTION EDELF(L,M,T,DA,DB)
C
    GET CHANGE OF E, S, CV WITH DENSITY ALONG ISOTHERMS.
```

```
GET EDELF, DELS, DELCV FROM DA TO DB ON ISOTHERM T.
C
C
     ROMBERG NUMERICAL INTEGRATION VIA -
C
     CARNAHAN/LUTHER/WILKES, APPLIED NUMERICAL METHODS, P. 90,
C
     JOHN WILEY AND SONS. INC., N.Y., 1969.
     NOTE, VALUE OF LD CONTROLS CONVERGENCE LIMITS.
C
     NOTE, NMAX = M, NK = FINAL, TOTAL SUBDIVISIONS OF INTERVAL DX.
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      COMMON/11/ DELS. DELCV
      COMMON/12/ZCRT, ZCALC, DZDT, ZSAT, DZSDT, ZFX, FRT, DFRTDT
      DIMENSION E(20), S(20), C(20)
      DATA (LD=2), (DI=0.00001), (G=0.083145)
    1 FORMAT(1H09X*EDELF L =*12,5H, N =13,5H, T = F8.3,6H, DA =E10.4,
     1 6H, DB =E10.4, 6H, LD =I2//
     2 10X 1HN 7X5HEDELF 8X4HDELS 7X5HDELCV )
    2 FORMAT(1HO 9X 6HEDIF =F10.3, 8H, SDIF =F10.5, 9H, CVDIF =F10.3)
    3 FORMAT(6X I5, F12.3, F12.5, F12.3)
    4 FORMAT(1HO 9X *EDELF NG AT TCRT FOR CV AT DEN NEAR OR GT C.P.*/)
     FOR DA=O AND DB.LE.DI, IDEAL GAS, EDELF=DELS=DELCV=O.
     FOR DA=O AND DB.GT.DI. START ROMBERG WITH DA = DI. -
     TO AVOID INFINITIES IN ORDINATE FUNCTIONS AT DA = 0.
    5 \text{ NK} = 1 \text{ } \text{DM} = \text{DCRT}/2 \text{ } \text{DZ} = 0.98 \times \text{DCRT}
    9 \text{ ZK} = 1.0 - 1/\text{ZCRT} $ RK = 100 \times \text{G} \times \text{TCRT}/\text{DCRT}
   10 IF(L.EO.O) 11.14
   11 IF(DB.LE.DI) 12.13
   12 EDELF = DELS = DELCV = 0 $
                                      RETURN
   13 DA = DI
C
     GET FIRST TRAPEZOID AREA, E(1) ETC., FROM DA TO DB.
   14 DX = DB - DA $ P = PVTF(T,DA,O) $ IF(DA.LT.DM) 16.17
   16 EA = RK*(ZK*ZSAT*ZFX + FRT - T*DFRTDT) $ GO TO 18
   17 EA = 100*(P-T*DPDT)/DA/DA
   18 IF(L.EQ.0) 19,20
   19 SA = -RK*DFRTDT $ GO TO 21
   20 \text{ SA} = -100 \times \text{DPDT/DA/DA}
   21 CA = -100*T*D2PDT2/DA/DA
   22 P = PVTF(T.DB.0) $ IF(DB.LT.DM) 23.24
   23 EB = RK*(ZK*ZSAT*ZFX + FRT - T*DFRTDT) $ GO TO 25
   24 EB = 100*(P-T*DPDT)/DB/DB
   25 IF(L.E0.0) 26,27
   26 SB = -RK*DFRTDT $ GO TO 28
   27 SB = -100*DPDT/DB/DB
   28 CB = -100*T*D2PDT2/DB/DB
   INTERVAL HALVING, GET E(N+1), ETC.
   30 D0 60 N=1, M   K = N + 1
   31 JM = 2**N - 1 $ DXN = DX/2**N $ E(K) = S(K) = C(K) = 0
   33 DO 45 J=1,JM,2 \$ NK = NK+1 \$ DN = DA + J*DXN
   34 P = PVTF(T,DN,0) $ IF(DN.LT.DM) 35,36
   35 EB = RK*(ZK*ZSAT*ZFX + FRT - T*DFRTDT) $ GO TO 37
   36 EB = 100*(P-T*DPDT)/DN/DN
   37 IF(L.E0.0) 38.39
   38 SB = -RK*DFRTDT $ GO TO 40
   39 SB = -100*DPDT/DN/DN
   40 \text{ CB} = -100 \text{ T*D2PDT2/DN/DN}
```

```
41 F(K) = E(K) + EB  S(K) = S(K) + SB  C(K) = C(K) + CB
  45 CONTINUE $ E(K) = E(N)/2 + E(K)*DXN
  46 S(K) = S(N)/2 + S(K)*DXN $ C(K) = C(N)/2 + C(K)*DXN
    TEST FOR CONVERGENCE.
   50 ED=ABS(E(K)-E(N)) SD=ABS(S(K)-S(N)) CD=ABS(C(K)-C(N))
   53 IF(ED.LT.0.4/LD) 54,60
   54 IF(SD.LT.0.002/LD) 55.60
  55 IF(T.EO.TCRT.AND.DB.GT.DZ) GO TO 57
   56 IF(CD.LT.0.04/LD) 57.60
  57 EDELF = E(K) $ DELS = S(K) $ DELCV = C(K) $ RETURN
  60 CONTINUE $ N = M $ NM = N-1 $ NP = N+1
  61 PRINT 1, L, N, T, DA, DB, LD
  62 PRINT 3, NM, E(NM), S(NM), C(NM) $ PRINT 3, N, E(N), S(N), C(N)
  64 PRINT 3, NP,E(NP),S(NP),C(NP) $ PRINT 2, ED, SD, CD
  99 STOP
           $
               END
     FUNCTION FINDENF(T.P)
C
    ON ISOTHERM T, FIND DEN, MOL/L, TO MINIMIZE (P-PC) VIA EQNSTATE.
     COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
     COMMON/3/DPDT.D2PDT2.DPSDT.DPMDT.DPDD.DPDR.DTSDR.DTHDR.DDSDT
     DATA (GKK = 0.083145)
  41 FORMAT(1HO 9X *FINDENF = 0, FAILS TO CONVERGE. * / )
  42 FORMAT(1HO 9X *FINDENF = DCRT, DP/DR ZERO OR NEG. * / )
  43 FORMAT(1HO 9X *FINDENF = 0. DOUBLE-VALUED AT P = PSAT. * / )
     DM = 1.05*DTRP
     IF(P.GT.0) 1.35
   1 IF(T-TCRT) 2,5,8
   2 DG=DENGASF(T) $ DL=DENLIQF(T) $ PS=PSATF(T) $ IF(P-PS) 3,32,4
   3 D = DG/2  $ GO TO 11
   4 D = (DL+DTRP)/2 $ GO TO 11
   5 DG=DL=DCRT $ PS=PCRT $ IF(P-PS) 6,33,7
   6 D = DCRT/2  $ GO TO 11
   7 D = 2*DCRT $ GO TO 11
   8 IF(T.LT.450.0) 9.10
   9 PC = PVTF(T,DCRT,0) $ IF(P-PC) 6,33,7
  10 D = DCRT
  11 DO 30 J=1,50 $ DP=P-PVTF(T,D,1) $ IF(ABS (DP/P)-1.0E-7) 31,31,12
  12 IF(DPDD.GT.0) 13,34
  13 DD = DP/DPDD $ IF(ABS (DD/D)-1.0E-7) 31,31,14
  14 D = D + DD $ IF(D.GT.0.0) 16,15
  15 D = P/GKK/T  $ GO TO 30
  16 IF(D.GT.DM) 17,18
  17 D = DM \$ GO TO 30
  18 IF(T-TCRT) 19.24.30
  19 IF(P.LT.PS) 20.22
  20 IF(D.GT.DG) 21,30
  21 D = DG  $ GO TO 30
  22 IF(D.LT.DL) 23.30
  23 D = DL \$ GO TO 30
  24 IF(P.LT.PCRT) 25,27
  25 IF(D.LT.DCRT) 30,26
  26 D = DCRT - 0.02 $ GO TO 30
```

```
27 IF(D.GT.DCRT) 30,28
28 D = DCRT + 0.02
30 CONTINUE $ PRINT 41 $ STOP
31 FINDENF = D $ RETURN
32 PRINT 43 $ STOP
33 FINDENF = DCRT $ RETURN
34 FINDENF = DCRT $ PRINT 42 $ RETURN
35 FINDENF=DPDT=D2PDT2=0 $ DPDD=GKK*T $ DPDR=DPDD*DTRP
36 RETURN
          $
                FND
   FUNCTION FINDTMF(P)
  GIVEN P ON THE MELTING LINE, FIND T FOR PROPANE.
   COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
   DATA (A=7180.0) (E=1.283)
 1 \times (P-PTRP)/A + 1 + 1 + FINDTMF = TTRP*X**(1.0/E) + RETURN + END
   FUNCTION FINDTSF(P)
  GIVEN VAPOR PRESSURE P, ITERATE T TO MINIMIZE (P-PC).
   COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
   COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
 1 FORMAT(1HO 9X *FINDTSF = 0, FAILS TO CONVERGE. * / )
 2 FORMAT(1HO 9X *FINDTSF = 0, P EXCEEDS PCRT. * / )
 3 IF(P-PCRT) 4,11,12
 4 T = 300  $ DO 9 J=1.50 $ DP = P - PSATF(T) $ ADP = ABS (DP)
 5 IF(ADP/P-1.0E-7) 10.6.6
 6 IF(ADP/DPSDT/T-1.0E-7) 10.7.7
 7 T = T + DP/DPSDT $ IF(T-TCRT) 9,9,8
 8 T = TCRT
 9 CONTINUE $ PRINT 1 $ STOP
10 FINDTSF = T $ RETURN
11 FINDTSF = TCRT
                    $ RETURN
12 PRINT 2 $ STOP $ END
   SUBROUTINE GENEOUS
  GIVEN P.T FOR THE HOMOGENEOUS DOMAIN -
  GET DEN AND FUNCTIONS AT ANY TEMPERATURE.
   COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
   COMMON/8/ IN, IK, P.T.DEN, E, H, S. CV, CP, CSAT, W, WK
   COMMON/11/ DELS. DELCV
   COMMON/99/ TI, EZZ, EZ, SZ, CVZ, HZ, CPZ
   DATA (Q=1.01325), (G=0.083145)
 3 \text{ TI} = T \text{ $ CALL IDEAL $ IF(P.GT.0) 4.10}
 4 DEN = DB = FINDENF(T,P) $ M = 15 $ DA = L = 0
 5 E = EZZ + EZ + EDELF(L,M,T,DA,DB) $ H = E + 100*P/DB
 6 S = SZ + DELS - 100*G*ALOG(G*T*DB/Q)
 7 \text{ CV} = \text{CVZ} + \text{DELCV} $ PX = PVTF(T,DB,1)
 8 \text{ CP} = \text{CV} + 100 \times \text{T/DPDD} \times (\text{DPDT/DB}) \times \times 2
 9 W = SORT(WK*CP*DPDD/CV) $
                               RETURN
12 W = SQRT(WK*CP*G*T/CV) $ RETURN $ END
```

C

```
SUBROUTINE GENIUS
     VALID ONLY FOR THE HOMOGENEOUS DOMAIN.
C
     SAVES COMPUTER TIME WHEN TABULATING FUNCTIONS ALONG ISOBARS.
     SAVES DEN, E, S, CV ALONG ISOBARS FOR USE IN INTEGRATING TO NEXT
C
     HIGHER ISOBAR. VALID ONLY FOR MONOTONICALLY INCREASING ISOBAR
C
     PRESSURES, AND AT TEMPS. T = INTEGER MULTIPLES OF 10 K.
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      COMMON/8/ IN.IK, P.T.DEN, E.H.S. CV.CP.CSAT, W.WK
      COMMON/11/ DELS, DELCV
      DIMENSION DK(70), EK(70), SK(70), CK(70)
    1 FORMAT(1HO 9X *GENIUS T NOT INTEGRAL. * / )
    2 J = T/10 $ IF(T - 10*J) 3,4
    3 CALL GENEOUS $ RETURN
    4 IF(IK.EO.IN) 5.9
    5 CALL GENEOUS
    6 \text{ DK}(J) = D \text{ EN} $ \text{EK}(J) = \text{E} $ \text{SK}(J) = \text{S} $ \text{CK}(J) = \text{CV} $ RETURN
    INTEGRATE FROM OLD DEN UP TO NEW DEN ON GIVEN ISOTHERM.
\mathbb{C}
    9 DA = DK(J) $ DK(J) = DEN = DB = FINDENF(T,P) $ N = 14
   11 EK(J) = E = EK(J) + EDELF(1,N,T,DA,DB) $ H = E + 100*P/DB
   13 SK(J) = S = SK(J) + DELS $ CK(J) = CV = CK(J) + DELCV
    NOW GET NEW DP/DT, DP/DD, CP, W.
   15 PX = PVTF(T,DB,1) $ CP = CV + 100*T/DPDD*(DPDT/DB)**2
   30 W = SQRT(WK*CP*DPDD/CV) $ RETURN $ END
      FUNCTION HSATF(T)
C
      PROPANE SATLIQ ENTHALPY, J/MOL.
     DEFINE YH # (H-HC)/(HT-HC), X # (TC-T)/(TC-TT), WHEN -
     YH = X + (XE-X)*(A1 + A2*X + A3*X2 + . . .)
      DIMENSION AH(7)
      DATA (NFH=7), (EH=0.37), (TTRP=85.47), (TCRT=369.85)
      DATA (HTRP = 0.001), (HCRT = 33082.187)
      DATA(AH = 0.2998573044, 0.3868586865, -0.6240978276,
     1 1.036003301, -0.9494397054, 0.1462986734, 0.1113755135)
    1 FORMAT(1HO 9X 3HT =F10.5, * IN HSATF(T).*/)
    2 IF(T.GT.TCRT) 3,4
    3 PRINT 1, T $ STOP
    4 \times = (TCRT-T)/(TCRT-TTRP) $ IF(X.LE.0) 5.6
    5 HSATF = HCRT $ RETURN
    7 FX = FX + V*AH(K)*X**(K-1)
    8 HSATF = HCRT - (HCRT-HTRP)*FX $ RETURN $ END
      SUBROUTINE IDEAL
C
     PROPANE IDEAL GAS (1 ATM) THERMOFUNCTIONS VIA CHAO (1973).
C
     (HZ-HZZ)/RT = 4.0 + (A + B/Q + C/Q2 + D/X)*EXP(-E/X), WHERE -
     X # T/100, Q # CUBERT(X).
      COMMON/99/ TI, EZZ, EZ, SZ, CVZ, HZ, CPZ
      DIMENSION A(6)
      DATA (E=3.0),(R=8.31434),(SI=32.552)
      DATA(A = 24.11012, 94.40550, -585.32814,
     1 980.124065, -678.64094, 170.42778)
    1 X=TI/100 $ Q=CUBERT(X) $ DQDX=Q/3/X $ XP=EXP(-E/X)
    2 H = 4.0 $ SUM = SM1 = 0 $ DO 7 K=1,6
```

```
3 H = H + A(K)*XP*O**(1-K) $ L = 4-K $ OL = 0**L
    4 \text{ SUM} = \text{SUM} + \text{A(K)*QL}  \text{SM1} = \text{SM1} + \text{A(K)*L*QL*DQDX/Q}
   7 CONTINUE $ CP = 4.0 + (E*SUM/X/X + SM1)*XP
C
     S = S(300) + INTEGRAL(CP/X)*DX FROM T=300 UP TO TI.
   10 N = ABS(TI-300)/4 + 4   DX = (X-3)/N   S = SI
   12 DO 20 J=1.N X = 3.0 + (J-0.5)*DX  0 = CUBERT(X)
   14 DODX = 0/3/X $ XP = EXP(-E/X) $ SUM = SM1 = 0
   15 DO 19 K=1.6 $ L = 4 - K $ OL = 0**L
   16 SUM = SUM + A(K)*OL $ SM1 = SM1 + A(K)*L*OL*DODX/O
   19 CONTINUE $ CPX = 4.0 + (E*SUM/X/X + SM1)*XP
   20 S = S + CPX*DX/X
     CONVERT TO DIMENSIONED RESULTS, JOULES, MOLES, KELVINS.
   22 \text{ CPZ} = R*CP \$ SZ = R*S \$ HZ = R*TI*H
   RETURN $ END
     SUBROUTINE ISOTHRM
C
     PRINTOUT THE CRITICAL ISOTHERM.
     COMMON/1/AL,BE,GA,DE,EP,ET, DCRT,TCRT,PCRT, DGAT,DTRP,TTRP,PTRP
     COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
     COMMON/4/XB1, XB2, XC1, XC2, XE1, XE2, DXBDR, DXCDR, DXEDR
     COMMON/6/ TSAT, THETA, PSAT
     DATA (WM = 44.09721)
    1 FORMAT(1H1 14X *THE CRITICAL ISOTHERM, PROPANE* //
    1 6X6HTC,K = F7.2, 12H, DC,KG/M3 = F9.4, 10H, PC,MPA = F10.7/ 6X
    2 *AT THE C.P., DPS/DT =*F9.6, 9H, DP/DT =F9.6, * MPA/K.* //
    3 6X4HD/DC 9X5HTS/TC 9X5HPS/PC 10X4HP/PC 9X5HDP/DR 4X6HDTS/DR
    4 4X6HDTH/DR 4X6HDPS/DR 4X6HDXB/DR 4X6HDXC/DR )
   2 FORMAT(2X F8.3, 3F14.10, F14.9, 5F10.5)
    3 PC = PVTF(TCRT,DCRT,0) $ PCS = PCRT/10 $ DCS = DCRT*WM
     DPST = DPSDT/10 $ DPT = DPDT/10
   4 PRINT 1, TCRT, DCS, PCS, DPST, DPT $ DO 8 J=1,41
   5 DR = 0.895 + 0.005*J  $ DN = DR*DCRT
   6 PR = PVTF(TCRT,DN,1)/PCRT $ DPSDR = DPSDT*DTSDR
   7 TSN = TSAT/TCRT $ PSN = PSAT/PCRT
     8 PRINT 2, DR, TSN, PSN, PR, DPDR, DTSDR, DTHDR, DPSDR, DXBDR, DXEDR
    9 RETURN $
                  END
     SUBROUTINE JTLOCUS
C
    THE JOULE-THOMSON P-V-T LOCUS FOR PROPANE.
    DERIVE THE J-T INVERSION CURVE. USE ROUTINE DELTAF(T,DI).
     COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
     DIMENSION DK(60), DN(60), TT(60), PP(60)
     DATA (A=2.77755), (B=0.60625), (TZ=500.0), (WM=44.09721)
    1 FORMAT(1H1 16X *THE JOULE-THOMSON INVERSION LOCUS FOR PROPANE* //
    2 17X 3HT,K 8X2HDI 5X5HKG/M3 5X5HP,MPA
    3 7X 3HT,K 8X2HDI 5X5HKG/M3 5X5HP,MPA )
   2 FORMAT(10X I10, 2F10.1, F10.3, I10, 2F10.1, F10.3)
    SAVE INITIAL, TRIAL DENSITY, DK(I) = DI.
   7 T = TA + 10*I   V = T/TZ   DK(I) = DI = EXP(A-B*U)
```

```
10 IF(T-TCRT) 11,12,12
   11 DL = DENLIOF(T) $ IF(DI.LT.DL) 23,12
   12 SS = DELTAF(T,DI) $ DO 20 IT=1,14
   14 D=DI-DX $ SL=DELTAF(T,D) $ D=DI+DX $ SP=DELTAF(T,D)
  15 IF(SS-SL) 18.16.16
   16 IF(SP-SL) 19,17,17
   17 \text{ SS} = \text{SL} \quad \$ \quad DI = DI - DX \quad \$ \quad GO \quad TO \quad 20
   18 IF(SS-SP) 20,20,19
   19 SS = SP  $ DI = DI + DX
   20 DX = DX/2    TT(I) = T    DN(I) = DI    PP(I) = PVTF(T,DI,O)
   21 GO TO 25
   23 TT(I) = T    DK(I) = DN(I) = PP(I) = O
   25 CONTINUE $N = NP/2$
   26 DO 35 J=1,N $
                      K = J + N
   27 \text{ IT} = TT(J)  $ ITT = TT(K)
   29 DKK = WM*DK(K) $ DNK = WM*DN(K)
   30 PPJ = PP(J)/10 $ PPK = PP(K)/10
   35 PRINT 2, IT, DKJ, DNJ, PPJ, ITT, DKK, DNK, PPK
   40 RETURN $ END
      SUBROUTINE PEEK
C
     EXAMINE BEHAVIOR OF THE PVT COEFFICIENTS.
C
     B(S) \# B1 + B2*S2, E(S) \# E1*(S-1)*(S-ER)*EXP(-GA*S**IX).
\mathbb{C}
            R # DEN/DTRP, S # DEN/DCRT.
     COMMON GK.GKK, B1.B2.B3.B4.B5, C1.C2.C3, E1.E2.E3, ER.IX
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
      COMMON/6/ TSAT, THETA, PSAT
      DATA (WM = 44.09721) (EX = 1.10)
   4 FORMAT(1H1 14X *EQUATION OF STATE COEFFS., PROPANE * //
     1 15X 6HTTRP =F7.3, 8H, TBLP =F9.4, 8H, TCRT =F8.3, * K* /
     2 15% 6HPTRP =E12.6, 8H, PBLP =F8.6, 8H, PCRT =F9.6, * MPA* /
     3 15X 6HDTRP =E11.5, 8H, DLBP =E11.5, 8H, DCRT =E11.5, * KG/M3* /
     3 15X 6HDGAT =E11.5, 8H, DGBP =E11.5, * KG/M3* /
     3 15X *DPS/DTB, MPA/K =* E11.5, *, QVAPB, KJ/MOL =* F7.3//
     4 15X 4HIX =12, 6H, EX =F5.2, 6H, ER =F5.2, *, S # DEN/DCRT* /
     5 15X 4HAL =F10.7, 6H, BE =F10.7, 6H, GA =F10.7/
     6 15X 4HDE =F10.7, 6H, EP =F10.7, 6H, ET =F10.7//
    7 15X 4HB1 =F14.11, 6H, B2 =F14.11, 6H, B3 =F14.11/
    8 15X 4HC1 =F14.11, 6H, C2 =F14.11, 6H, C3 =F14.11/)
    5 FORMAT(15X 4HD/DC 6X4HTSAT 5X5HTHETA 4X6HPS,MPA 9X1HB 9X1HC )
   6 FORMAT(9X F10.2, 2F10.3, F10.4, 2F10.5)
   8 TB=FINDTSF(1.01325) $ DGB=DENGASF(TB) $ DLB=DENLIQF(TB)
    9 \text{ OB} = \text{TB*DPSDT*}(1/\text{DGB} - 1/\text{DLB})/10.0
      DTR = DTRP*WM $ DLBI = DLB*WM $ DCR = DCRT*WM
      DGA = DGAT*WM $ DGBI = DGB*WM $ DPSB = DPSDT/10
   10 PRINT 4, TTRP, TB, TCRT, PTR, PBLP, PCR, DTR, DLBI, DCR, DGA, DGBI, DPSB, OB,
     1 IX,EX,ER, AL,BE,GA,DE,EP,ET, B1,B2,B3, E1,E2,E3
  11 PRINT 5 $ N = 10*DTRP/DCRT + 1
  12 DO 20 J=1,N S = 0.1*J
  13 DN = S*DCRT $ S2=S*S $ SN=S-1 $ SX = S**IX
```

```
16 B = B1 + B2*S2
   17 E = (E1 + E2*S)*SN*SR*EXP(-GA*SX)
   19 TSAT=TS=TSATF(DN) $ TH=THETAF(DN) $ PS=PSATF(TS) $ PIS=PS/10
   20 PRINT 6, S, TS, TH, PIS, B, E $ RETURN $ END
      FUNCTION PMELTF(T)
C
     PROPANE MELTING LINE, BAR, VIA REEVES, SCOTT, AND BABB(JR),
     J. CHEM. PHYS. 40(12), 3662 (1964).
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT, D2PDT2, DPSDT, DPMDT, DPDD, DPDR, DTSDR, DTHDR, DDSDT
      DATA (A = 7180.0), (E = 1.283)
    1 X = T/TTRP $ XE = X**E $ PMELTF = PTRP + A*(XE-1)
    2 DPMDT = A*E*XE/X/TTRP $ RETURN $ END
      FUNCTION PSATF(T)
C
     PROPANE VAPOR PRESSURE, BAR, RDG, FEB. 19, 1981. (DCRT=5.00).
     LN(P) = P1/X + P2 + P3*X + P4*X2 + P5*X3 + P6*(1-X)**EPP.
      COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
      DIMENSION PJ(6)
      DATA (EPP = 1.35)
      DATA (TTRP=85.47), (TCRT=369.85), (DCRT=5.00), (DTRP=16.63)
      DATA(PJ = -8.722780250, 19.203078280, -15.610638913,
     1 12.685790059, -3.806542924, 1.883214505)
    1 FORMAT(1HO 9X *T ABOVE TCRT IN PSATF(T). * / )
    4 X = T/TCRT   V = 1.0 - X   IF(V) 7.8.9
    7 PRINT 1 $
                  STOP
    8 Z = Z1 = 0  $ G0 T0 10
    9 Z = V**EPP $ Z1 = -EPP*Z/V
                    PL1 = PJ(6)*Z1
   10 \text{ PL} = PJ(6)*Z
   11 DO 13 K=1,5 $ L = K-2 $ XL = X^*L
   12 PL = PL + PJ(K)*XL $ PL1 = PL1 + PJ(K)*L*XL/X
   13 CONTINUE \$ PSATF = EXP(PL)
   15 DPSDT = PL1*PSATF/TCRT $ RETURN $ END
      SUBROUTINE PYTDATA
     PROPANE EOS CONSTANTS, RDG/NBS, FEB. 19, 1981. (DCRT=5.00).
      COMMON GK.GKK. B1.B2.B3.B4.B5. C1.C2.C3. E1.E2.E3. ER. IX
      COMMON/1/AL,BE,GA,DE,EP,ET, DCRT,TCRT,PCRT, DGAT,DTRP,TTRP,PTRP
      COMMON/8/ IN, IK, P, T, DEN, E, H, S, CV, CP, CSAT, W, WK
      COMMON/12/ZCRT, ZCALC, DZDT, ZSAT, DZSDT, ZFX, FRT, DFRTDT
      COMMON/99/ TI, EZZ, EZ, SZ, CVZ, HZ, CPZ
   10 WM = 44.09721 $ TTRP = 85.47 $ TCRT = 369.85
   12 DCRT = 5.000 $ DTRP = 16.630
   13 PTRP = PSATF(TTRP) $ PCRT = PSATF(TCRT)
   20 GKK = 0.083145 $ GK = GKK*DCRT $ ZCRT = PCRT/DCRT/GKK/TCRT
   21 IX = 2 $ AL = 1.0 $ BE = 0.7 $ GA = 0.15 $ DE = 0
   22 EP = 0 $ ER = 2.20 $ ET = 1.1
   23 B1 = 0.45650524198 $
                              B2 = 0.15822653715
   24 E1 =-0.24904576736 $ B3=B4=E2=E3=0
   25 DGAT = DENGASF(TTRP) $ WK = 100000/WM $ EZZ = 21888.910
```

14 SR = 1 \$ IF(ER.GT.0) SR = S-ER

```
FUNCTION PVTF(T,D,M)
     PROPANE EONSTATE, PVTF = P,BAR. SIMPLIFIED, FEB. 12, 1981.
C
     NOTE, M=O RETURNS DP/DT, D2P/DT2. M=1 RETURNS ALSO DP/DD.
C
     P-PSAT = S*GK*(T-TSAT) + S*S*GK*TCRT*F(S,T), WHERE -
C
C
     F(S,T) \# B(S)*XBF(S,T) + E(S)*XEF(S,T), AND -
     B(S) \# B1 + B2*S2, E(S) \# E1*(S-1)*(S-ER)*EXP(-GA*S**IX).
C
     WHERE, R # DEN/DTRP, S # DEN/DCRT.
C
      COMMON GK, GKK, B1, B2, B3, B4, B5, C1, C2, C3, E1, E2, E3, ER, IX
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
      COMMON/4/XB1,XB2, XC1,XC2, XE1,XE2, DXBDR,DXCDR,DXEDR
      COMMON/6/ TSAT, THETA, PSAT
      COMMON/12/ZCRT,ZCALC,DZDT, ZSAT,DZSDT,ZFX, FRT,DFRTDT
    5 GK = DCRT*GKK $ TC = TCRT $ DSDR = DTRP/DCRT
    6 \text{ RG} = \text{S*GK}
                \$ GKT = GK*TC
    7 TSAT=TS=TSATF(D) $ PSAT=PS=PSATF(TS) $ THETA=THETAF(D)
    8 \times B = \times BF(T,D) $
                        XE = XEF(T,D)
    9 B = B1*S2 + B2*S2*S2
   10 XP = EXP(-GA*SX) $ SM = S2*SN*SR $ E = E1*SM*XP
   12 F = B*XB + E*XE $ F1 = B*XB1 + E*XE1 $ F2 = B*XB2 + E*XE2
   13 PVTF = PS + RG*(T-TS) + GKT*F \$ FRT=F/S2 \$ DFRTDT=F1/S2/TC
   14 DPDT = RG + GK*F1 $ D2PDT2 = GK*F2/TC $ IF(M) 15,30
   15 BD = (2*B1 + 4*B2*S2)*S*DSDR
   16 \text{ XP1} = -IX*GA*SX/S  $ SM1 = (SN+SR)*S2 + 2*S*SN*SR
   18 ED = E1*(SM*XP1 + SM1)*XP*DSDR
   20 \text{ F1} = \text{B*DXBDR} + \text{BD*XB} + \text{E*DXEDR} + \text{ED*XE}
   26 DPDR = (DPSDT-RG)*DTSDR + (T-TS)*GK*DSDR + GKT*F1
   27 DPDD = DPDR/DTRP
   30 RETURN $ END
      FUNCTION OVAPXF(T)
     PROPANE QVAP, J/MOL, RDG/NBS, FEB. 20, 1981.
     QVAP = A1*X + (XE-X)*(A2 + A3*X + A4*X2 + . . ).
     X \# (TC-T)/(TC-TT), XE \# X**E.
      DIMENSION AQ(4)
      DATA (NFQ=4), (EQ=0.38), (TTRP=85.47), (TCRT=369.85)
      DATA(AQ = 24.840848, 24.166535, 6.252384, -12.156857)
    1 FORMAT(1HO 9X *T EXCEEDS TCRT IN OVAPXF(T). * / )
    2 IF(TCRT-T) 3,4,5
    3 PRINT 1 $ STOP
    4 \text{ OVAPXF} = 0 \text{ $RETURN}
    5 \times N = TCRT - TTRP    X = (TCRT-T)/XN    XE = X**EO
    6 F = 0  $ DO 7 K=2,NFQ
    7 F = F + AO(K)*X**(K-2)    0 = AO(1)*X + (XE-X)*F
   10 QVAPXF = Q*1000 $ RETURN $ END
```

SUBROUTINE SIMPLE
C FOR ANY GIVEN T,K AND P,MPA, CONVERT TO P,BAR, AND USE SUBROUTINE

```
C
     THERMO (OR ENTRIES THEREIN) TO GET THERMOPHYSICAL PROPERTIES.
C
     THEN CONVERT TO MPA, AND KG/M3 IN PRESENT ROUTINE.
     COMMON/3/DPDT.D2PDT2,DPSDT,DPMDT, DPDD,DPDR,DTSDR,DTHDR,DDSDT
     COMMON/8/ IN.IK, P.T.DEN, E.H.S. CV.CP.CSAT, W.WK
     COMMON/99/ TI, EZZ, EZ, SZ, CVZ, HZ, CPZ
     DATA (R=0.083145), (GJ=8.3145), (PA=1.01325), (WM=44.09721)
  14 FORMAT(1H1 18X *TEST OF THERMO AT P.MPA =* F8.5/
    1 19X *DENSITIES KG/M3, HEATS J/MOL. * / )
  16 FORMAT(6X4HPMPA 9X1HT 6X3HDEN 8X1HZ 5X5HDP/DT 5X5HDP/DD
     1 8X1HE 8X1HH 8X1HS 6X2HCV 6X2HCP 5X1HW 9X3HF/P 5X4HDIEL )
  17 FORMAT(1X F9.4, F10.3, F9.2, F9.5, F10.5, F10.6, 2F9.1, F9.3,
    1 2F8.2, I6, E12.5, F9.5)
    LET US EXAMINE A SUBCRITICAL ISOBAR.
  19 PMPA = 3.5
   20 P = 10*PMPA $ PRINT 14. PMPA $ PRINT 16
   21 DO 90 J=1,39 \$ TIK = T = 110 + 10*J
  22 CALL THERMO $ IW = W $ Z = P/DEN/R/T
    GET DIEL.CONST., AND FUGACITIES.
   25 GIB = H-EZZ-HZ-T*(S-SZ) $ FOP = EXP(GIB/GJ/T)*PA/P
   26 IF(T.GT.450) 27,28
   27 DIE = 0 $ GO TO 30
  28 DIE = DIELF(DEN.T.P)
    CONVERT PRESSURES, DENSITIES, AND DERIVATIVES.
   30 PMPA=P/10 $ DEN=DEN*WM $ DPDT=DPDT/10 $ DPDD=DPDD/10/WM
   31 DPMDT = DPMDT/10 $ DPSDT = DPSDT/10 $ DDSDT = DDSDT*WM
  40 PRINT 17, PMPA, T, DEN, Z, DPDT, DPDD, E, H, S, CV, CP, IW, FOP, DIE
  90 CONTINUE $ RETURN $ END
     FUNCTION SSATF(T)
     PROPANE SATLIQ ENTROPY, J/MOL/K.
    CONSTRAINED AT TRIPLE AND CRITICAL POINTS.
C
C
    Y \# (S-SCRT)/(STRP-SCRT), X \# (TC-T)/(TC-TT).
    Y = X + (XE-X)*(A1 + A2*X + A3*X2 + . . . ).
     DIMENSION AS(8)
     DATA (NFS=8), (ES=0.32), (TTRP=85.47), (TCRT=369.85)
     DATA (STRP = 82.56147), (SCRT = 234.72617)
     DATA(AS = 0.1263077082, -0.7539546218, 1.253270427, -5.96961033,
    1 14.0277688, -20.62894506, 16.01178434, -5.411082748)
    1 FORMAT(1HO 9X 3HT =F10.5, * IN SSATF(T). * / )
   2 IF(TCRT-T) 3,4,5
   3 PRINT 1, T $ STOP
   4 SSATF = SCRT $
                       RETURN
   5 YN = STRP-SCRT $ XN = TCRT-TTRP
   6 X = (TCRT-T)/XN    XE = X**ES    V = XE - X
   7 Y = X  $ DO 8 K=1,NFS
   8 Y = Y + V*AS(K)*X**(K-1)
   9 SSATF = SCRT + YN*Y $
                                RETURN
                                             END
     SUBROUTINE TABLIO
```

COMMON/1/AL,BE,GA,DE,EP,ET, DCRT,TCRT,PCRT, DGAT,DTRP,TTRP,PTRP COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT COMMON/6/ TSAT, THETA, PSAT

```
COMMON/8/ IN.IK. P.T.DEN. E.H.S. CV.CP.CSAT. W.WK
    COMMON/9/DNG.EG.HG.SG. CVG.CPG.WG. DPGDT.DPGDD
    COMMON/12/ZCRT, ZCALC, DZDT, ZSAT, DZSDT, ZFX, FRT, DFRTDT
    COMMON/99/ TI,EZZ, EZ,SZ,CVZ, HZ,CPZ
    DIMENSION DSA(60), TSA(60), PSA(60), DLT(60), DPT(60), DPD(60)
    DATA (G=0.083145), (WM=44.09721)
  4 FORMAT(1H1 13X *PROPERTIES OF SATURATED LIQUID PROPANE* //
   1 14X 1HT 11X1HP 3X5HDEN,L 7X5HDEN,G 5X3HZ,L 5X3HZ,G
   2 5X6HDPS/DT 3X6HDDL/DT 3X5HDP/DT 6X5HDP/DD /
   3 14X 1HK 9X3HMPA 3X5HKG/M3 7X5HKG/M3 16X
   4 6X5HMPA/K 2X7HKG/M3/K 3X5HMPA/K 2X9HMPA-M3/KG )
  5 FORMAT(5XF10.3, E12.5, F8.2, E12.5, 2F8.5, E11.4, F9.4, F8.4, E11.4)
 11 FORMAT(1H1 13X *PROPERTIES OF SATURATED LIQUID PROPANE * //
   1 14X 1HT 4X5HQ, VAP 8X1HE 8X1HH 8X1HS
   2 6X2HCV 6X2HCS 6X2HCP 6X3HF/P 6X1HW 4X5HDIEL. /
   3 14X 1HK 4X5HJ/MOL 4X5HJ/MOL 4X5HJ/MOL 2X7HJ/MOL/K
   4 1X7HJ/MOL/K 1X7HJ/MOL/K 1X7HJ/MOL/K 11X 5HM/SEC 4X5HCONST )
 12 FORMAT(5X F10.3, 3F9.1, F9.3, 3F8.2, F9.5, I7, F9.5)
   FOR PAGE ONE OF TABLIQ.
   REPLACE T = 230 BY B.P. AT J = 30.
120 \text{ NP} = 58 \text{ } \text{PRINT } 4
121 DO 150 J=1,NP $ IF(J.EQ.1) 122,123
122 T = TTRP $ GO TO 139
123 IF(J.E0.30) 124,125
124 T = FINDTSF(1.01325) $ GO TO 139
125 IF(J.EQ.NP) 126,128
126 \text{ T} = \text{TCRT} \quad \text{SDA(J)} = \text{DG} = \text{DL} = \text{DCRT} \quad \text{SDLT(J)} = \text{DDLDT} = 0
127 VG = VL = 1.0/DCRT $ ZG = ZCRT $ GO TO 141
128 T = 80 + 5*J
139 DSA(J) = DL = DENLIOF(T) $ DLT(J) = DDLDT = DDSDT
140 DG = DENGASF(T) S = ZG = ZSAT + VG = 1/DG + VL = 1/DL
147 PSA(J) = PS = PSAT $ Z = PS/DL/G/T
148 PS=PS/10 $ DPSDT=DPSDT/10 $ DPDT=DPDT/10 $ DPDD=DPDD/10
149 DL=DL*WM $ DG=DG*WM $ DDLDT=DDLDT*WM $ DPDD = DPDD/WM
150 PRINT 5, T.PS, DL.DG, Z.ZG, DPSDT.DDLDT, DPDT.DPDD
   PAGE 2, TABLIQ. AVOID COEXIST, TIMESAVER.
   USE COEXIST AT ALL TEMPERATURES.
160 PRINT 11 $ DO 180 J=1, NP $ T = TSA(J) $ P = PSA(J)
161 CALL COEXIST $ DL = DEN $ IW = W
162 DIEL = DIELF(DL,T,P) \qquad QX = QVAPXF(T)
  GET FUGACITY COEF., (F/P), VIA HZ, SZ, HG, SG.
   NOTE, DI = 0.00001 MOL/L IN EDELF.
170 \text{ GIBS} = HG-EZZ-HZ - T*(SG-SZ)
171 \text{ GJ} = 100 \text{*G} \text{ } \text{XP} = \text{EXP}(\text{GIBS/GJ/T}) \text{ } \text{FOP} = \text{XP*1.01325/P}
172 IF(DNG.LE.O.00001) FOP = 1.0
180 PRINT 12, T,QX, E,H,S, CV,CSAT,CP, FOP, IW, DIEL
999 RETURN $ END
```

SUBROUTINE THERMO

- C FOR COMPUTATION AT ANY (T,P) POINT.
- C ASSUMES AN ISOTHERM IN SINGLE-PHASE ONLY.
- C CASES FOR ISOTHERMS BELOW, EQ., ABOVE TCRT.

```
C
     GIVEN (T.P), RETURNS DEN, E.H.S. CV, CP, W. DPDT, DPDD.
     ENTRIES BELOW FOR PHASE BOUNDARIES ASSUME A GIVEN ISOBAR P, OR -
C
\mathbb{C}
     ENTRIES BELOW FOR PHASE BOUNDARIES ASSUME A GIVEN ISOTHERM. T.
      COMMON/1/AL,BE,GA,DE,EP,ET, DCRT,TCRT,PCRT, DGAT,DTRP,TTRP,PTRP
      COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
      COMMON/8/ IN, IK, P, T, DEN, E, H, S, CV, CP, CSAT, W, WK
      COMMON/9/ DNG, EG, HG, SG, CVG, CPG, WG, DPGDT, DPGDD
     COMMON/99/ TI,EZZ, EZ,SZ,CVZ, HZ,CPZ
    1 FORMAT(1HO 9X *THERMO. P.GE.PMELT. * / )
    2 FORMAT(1HO 9X *THERMO DOUBLE-VALUED AT P = PSAT. * / )
    3 FORMAT(1HO 9X *THERMO. DEN GE. DCRT AT T = TCRT. * / )
   10 IF(T-TCRT) 11,20,25
    SUBCRITICAL ISOTHERMS.
  11 PM = PMELTF(T) $ IF(P.GE.PM) 12,13
   12 PRINT 1 $ CALL COMPRLQ $ TI=T $ CALL IDEAL $
                                                             RETURN
   13 PS = PSATF(T) $ IF(P-PS) 14,15,16
   14 CALL GENEOUS $ RETURN
   15 PRINT 2 $ RETURN
  16 CALL COMPRLO $ TI = T $ CALL IDEAL $ RETURN
    THE CRITICAL ISOTHERM.
   20 CALL GENEOUS $ IF(DEN.LT.DCRT) RETURN
   21 CP = CV = W = 0 $ PRINT 3 $ RETURN
     ISOTHERMS AT T ABOVE TCRT.
   25 CALL GENEOUS
                   $ RETURN
     THERMOM FOR GIVEN ISOBAR AT THE MELTING LINE, GET T.
C
     RETURNS T, DEN, E, H, S, CV, CP, W, DPMDT, DPDT, DPDD.
      ENTRY THERMOM
   40 T = FINDTMF(P)    PM = PMELTF(T)    SCALL COMPRLO
   41 TI = T $ CALL IDEAL $ RETURN
     THERMOL FOR GIVEN ISOBAR AT SATURATED LIQUID LINE, GET T.
C
     RETURNS T,DEN, E,H,S, CV,CP,CSAT,W, DPSDT,DDSDT, DPDT,DPDD.
      ENTRY THERMOL
   43 T = FINDTSF(P) $ CALL COEXIST $ RETURN
C
     THERMOV FOR GIVEN ISOBAR AT THE SATURATED VAPOR LINE, GET T.
     RETURNS T, DEN, E, H, S, CV, CP, W, DPSDT, DDSDT, DPDT, DPDD.
     ENTRY THERMOV
  45 T = FINDTSF(P) $ CALL COEXIST $ DEN=DNG $ E=EG $ H=HG $ S=SG
   47 CV=CVG $ CP=CPG $ W=WG $ DPDT=DPGDT $ DPDD=DPGDD $ RETURN
     THRMM FOR ISOTHERM AT THE MELTING LINE. GET P.
     RETURNS P.DEN, E.H.S. CV.CP.W. DPMDT, DPDT, DPDD.
      ENTRY THRMM
   50 P = PMELTF(T) $ CALL COMPRLQ $ TI=T $ CALL IDEAL $ RETURN
     THRML FOR ISOTHERM AT SAT. LIQ. LINE, GET P.
C
     RETURNS P,DEN, E,H,S, CV,CP,CSAT,W, DPSDT,DDSDT, DPDT,DPDD.
     ENTRY THRML
   55 P = PSATF(T) $ CALL COEXIST
                                    $ RETURN
    THRMV FOR ISOTHERM AT SAT. VAPOR LINE, GET P.
     RETURNS P,DEN, E,H,S, CV,CP,W, DPSDT,DDSDT, DPDT,DPDD
      ENTRY THRMV
   60 P = PSATF(T) $ CALL COEXIST
  61 DEN=DNG $ E=EG $ H=HG $ S=SG $ CV=CVG
   62 CP=CPG $ W=WG $ DPDT=DPGDT $ DPDD=DPGDD
   99 RETURN $ END
```

```
FUNCTION THETAF(DEN)
C
     THETA = TSAT*EXP(U(S)).
     LET Q = (S-1)/(ST-1), WHERE ST = DTRP/DCRT. THEN -
C
C
     IF S < 1. U = AL*0**3.
                          IF S > 1, U = -AL*Q**3,
      COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
     COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
     COMMON/6/ TSAT, THETA, PSAT
    1 S = DEN/DCRT $ DSDR = DTRP/DCRT $ C = DSDR-1
    2 0 = (S-1)/C    02 = 0*0    U = AL*0*02
    3 \text{ U1} = AL*3*02*DSDR/C $ IF(0) 5.9.4
    4 U = -U     U1 = -U1 
                 $ THETAF = TSAT*XP
   5 \text{ XP} = \text{EXP(U)}
   6 DTHDR = (TSAT*U1 + DTSDR)*XP $
                                         RETURN
   9 THETAF = TCRT $ DTHDR = 0 $
                                        RETURN
                                                     END
     FUNCTION TSATF(DEN)
C
     ITERATE T TO MINIMIZE (DEN-DCALC) VIA DENGASF(T), DENLIOF(T).
     IF ITERATION FAILS, PRINTOUT ONCE ONLY AND STOP AT K = 2.
     COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
     COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
     DATA (0=2.0), (FN=6.3890561)
     NOTE, FN \# EXP(Q) - 1.0.
   1 FORMAT(1H1 14X *TSATF(DEN) FAILS AT DEN =* E15.7//
    1 15X 5HDCALC 13X2HDD 10X5HDDSDT 13X2HDT 12X3HT.K )
    2 FORMAT(5X 5E15.7)
   3 K = 0  $ D = DEN
   4 S = D/DCRT  $ YN = TCRT/TTRP-1 $ IF(D-DCRT) 5.30.6
   5 ST=DGAT/DCRT $ F=ALOG(S)/ALOG(ST)*((1-S))/(1-ST))**2 $ GO TO 7
   6 ST=DTRP/DCRT $ U=((S-1)/(ST-1))**3 $ F=(EXP(0*U)-1)/FN
   7 T = TCRT/(YN*F+1)
   8 DO 20 J=1,50 $ IF(D-DCRT) 9,30,10
   9 DC = DENGASF(T) \$ GO TO 11
   10 DC = DENLIOF(T)
   12 DT = DD/DDSDT $ IF(ABS(DT/T).LT.1.0E-7) 25.13
   14 T = TTRP $ GO TO 18
   15 IF(T.LT.TCRT) 18,16
  16 T = TCRT - 0.05
   18 IF(K.EQ.1) PRINT 2, DC, DD, DDSDT, DT, T
   20 CONTINUE $ K = K+1 $ IF(K.NE.1) STOP
   21 PRINT 1, DEN $ GO TO 4
   25 TSATF = T $ DTSDR = DTRP/DDSDT $ RETURN
   30 TSATF = TCRT $ DTSDR = 0 $ RETURN $ END
      FUNCTION XBF(T,D)
    XBF(R,T) \# (X**BE)*EXP(A*(1-TS/T)) - XS**BE,
C
C
    X # T/TC, XS # TS/TC, A # (1-BE) + SQRT(1-BE),
     XBF = U*EXP(A*V) - US, U # X**B, US # XS**B, V # (1-TS/T).
     COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
      COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
     COMMON/4/XB1, XB2, XC1, XC2, XE1, XE2, DXBDR, DXCDR, DXEDR
```

```
COMMON/6/ TSAT, THETA, PSAT
 1 B = BE \$ BN = 1-B \$ A = BN + SORT(BN)
 2 TC=TCRT $ TS=TSAT $ X=T/TC $ XS=TS/TC $ XS1=DTSDR/TC
 3 U = X**B  $ U1 = B*U/X  $ U2 = -BN*U1/X
 4 US = XS**B $ US1 = B*US*XS1/XS
 5 V = 1-TS/T    V1R = -DTSDR/T    V1X = TS/T/X    V2X = -2*V1X/X
 6 P = EXP(A*V)    P1 = A*P    P2 = A*P1
 9 \times B2 = U*P2X + 2*U1*P1X + U2*P  9 \times DXBDR = U*P1R - US1
              END
10 RETURN $
   FUNCTION XEF(T,D)
  ULTRA REVISION, MARCH 29, 1981.
  XEF = H(R,T)/HS(R) - 1.0,
  H(R,T) # 1 - (W-WE/E)/(1-1/E), E = ET.
  X#T/TC, F#TS/T, W#(1-TH/T), WE#W**E
  A = DE, B = 1-A, C = EP, E = ET.
COMMON/1/AL, BE, GA, DE, EP, ET, DCRT, TCRT, PCRT, DGAT, DTRP, TTRP, PTRP
  COMMON/3/DPDT,D2PDT2,DPSDT,DPMDT,DPDD,DPDR,DTSDR,DTHDR,DDSDT
  COMMON/4/XB1, XB2, XC1, XC2, XE1, XE2, DXBDR, DXCDR, DXEDR
  COMMON/6/ TSAT, THETA, PSAT
 1 E = ET $ EK = E/(E-1) $ TC = TCRT
 2 TS = TSAT $ TH = THETA $ X = T/TC
 3 W = 1.0 - TH/T $ IF(W) 30,30,4
 4 CONTINUE
 5 W1R = -DTHDR/T $ W1X = TH/T/X $ W2X = -2*W1X/X
 7 WE1X = WE1*W1X $ WE2X = WE1*W2X + (E-1)*WE1*W1X*W1X/W
 8 H = 1 - EK*(W-WE/E)   $H1R = -EK*(W1R-WE1R/E)$
9 H1X = -EK*(W1X-WE1X/E) $ H2X = -EK*(W2X-WE2X/E)
10 \text{ WS} = 1.0 - \text{TH/TS} \text{ } \text{IF(WS)} 11,11,12
11 HS = 1 $ HS1 = 0 $ GO TO 16
12 \text{ WS1} = (\text{TH*DTSDR/TS} - \text{DTHDR})/\text{TS}
13 WSE = WS**E $ WSE1 = E*WSE*WS1/WS
16 U = 1.0/HS    U1R = -U*HS1/HS
17 P = H*U $ DXEDR = H*U1R + H1R*U
18 XE1 = H1X*U $ XE2 = H2X*U $ XEF = P - 1 $ RETURN
```

C

C

C

C

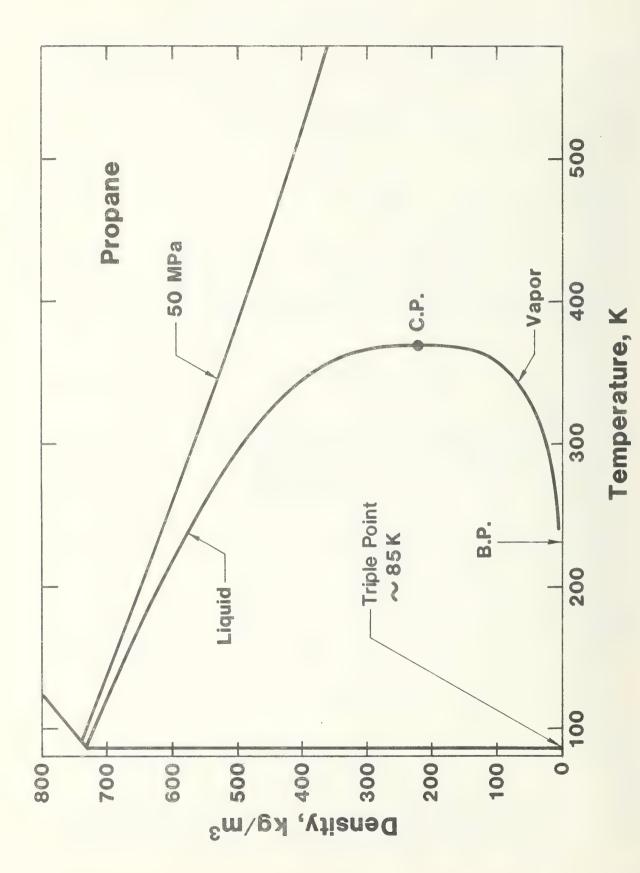


Figure 1. Density-temperature diagram of propane.

Table 1. Comparisons of vapor pressure data with eq (2).

	(20)0011011,	257111011143	, o, no a sa , (5)	,, KI GI ZKO, (70) I OK	ormann, (00) mormo	Loops.	
ID	Weight	Temp.	T/T _C	$P_{\sigma}(expt)$	Pa(calc)	Diff.	dP _O /dT
		K	., .,	MPa	MPa	%	MPa/K
		11		M d	INI a	/0	INIL CIVIL
80	•053	85.470	•23109	.16808E-09	.16895E-09	52	.688E-10
80	• 059	90.000	. 24334	.96721E-09	•96855E-09	14	•353E-09
80	•066	95.000	•25686	•54172E-08	•54123E-08	•09	
							.176E-08
80	•073	100.000	•27038	•25185E-07	.25139E-07	.18	• 730E-08
80	•081	105.000	•28390	•99897E <i>-</i> 07	•99697E-07	•20	.260E-07
80	.088	110.000	• 29742	• 34570 E – 06	•34511E-06	. 17	.814E-07
80	•097	115.000	.31094	•10632E-05	.10618E-05	.13	.227E-06
80	• 105	120.000	.32446	•29504E-05	.29481E-05	• 08	.574E-06
80	.114	125.000	•33797	•74833E-05	.74804E-05	.04	•133E-05
80	.124						
		130.000	.35149	•17535E-04	.17534E-04	•00	•286E-05
80	• 133	135.000	•36501	•38308E-04	•38316E-04	02	.574E-05
80	• 143	140.000	•37853	.78644E-04	.78671E-04	03	.109E-04
80	. 154	145.000	•39205	•1 5274E- 03	.15279E−03	04	.195E-04
80	• 164	150.000	•40557	.28226E-03	•28235E-03	03	.334E-04
80	.176	155.000	•41909	.49886E-03	•49897E-03	02	•547E-04
80	. 187	160.000	•43261	.84691E-03	.84700E-03	01	.865E-04
80	.199	165.000	•44613	.13865E-02	•13864E-02	.00	•132E-03
9	•202	166.190	.44934	• 15480E-02	•15512E-02	21	•145E−03
80	.211	170.000	•45965	.21963E-02	•21959E-02	•02	.195E-03
9	•220	173.320	•46862	.29330E~02	.29308E-02	• 08	.249E-03
80	•224	175.000	•47316	.33765E-02	•33756E-02	•02	.281E-03
9	•236	179.842	•48626	•49850E-02	.49878E-02	06	•390E-03
80	•237						
		180.000	. 48668	•50514E-02	•50497E-02	•03	•394E-03
9	•257	187.347	•50655	.87250E-02	.87296E-02	05	.621E-03
80	•264	190.000	•51372	•10516E-01	.10512E-01	• 04	.724E-03
80	.278	195.000	•52724	• 14693E-01	•14687E-01	•04	.954E-03
9	•278	195.131	•52759	.14803E-01	•14812E-01	06	.960E-03
80	292	200.000	•54076	.20140E-01	.20133E-01	•03	•123E-02
9	•301	202.910	•54863	•23987E-01	•23993E-01	02	.142E-02
80	•307	205.000	• 55428	.27127E-01	.27119E-01	• 03	.157E-02
9	•322	209.926	•56760	.35774E-01	•35798E-01	07	.196E-02
80	•322	210.000	• 56780	.35952E-01	.35944E-01	•02	•197E-02
9	•338	214.982	•58127	•46884E-01	•46893E-01	02	.244E-02
80	• 338	215.000	.58132	.46944E-01	•46937E-01	.02	•244E-02
80	•354		•59484				•298E-02
		220.000		.60460E-01	.60455E-01	•01	
9	-355	220.259	•59554	.61212E-01	•61231E-01	03	•301E-02
80	•370	225.000	•60835	.76882E-01	•76884E-01	00	.360E-02
9	•370	225.098	•60862	.77179E-01	•77238E-01	08	.362E-02
9	•383	228.806	•61865	•91484E-01	-91593E-01	12	•413E-02
80	.387	230.000	.62187	96624E-01	.96633E-01	01	.431E-02
9	•392	231.462	•62583	.10302E+00	.10310E+00	08	•453E-02
25	•487						
		258.150	•69799	•29179E+00	.29153E+00	• 09	.101E-01
25	1.000	263.150	•71150	•34549E+00	•34522E+00	•08	•114E-01
25	1.000	268.150	•72502	•40623E+00	•40601E+00	•05	•129E-01
25	1.000	273.150	•73854	•47462E+00	•47447E+00	•03	•145E-01
25	1.000	278.150	.75206	•55125E+00	•55118E+00	•01	.162E-01
25	1.000	283.150	•76558	.63672E+00	.63671E+00	•00	.180E-01
25	1.000	288.150	•77910	•73159E+00	•73167E+00	01	.200E-01
25	1.000						
		293.150	•79262	•83650E+00	•83665E+00	02	•220E-01
25	1.000	298.150	.80614	•95202E+00	•95229E+00	 03	.242E-01
25	1.000	303.150	. 81966	•10789E+01	•10792E+01	03	.266E-01
35	1.000	311.974	.84351	• 13318E+01	•13327E+01	07	.310E-01
35	1.000	312.360	.84456	.13446E+01	.13447E+01	01	•312E-01
25	1.000	313.150	.84669	• 13692E+01	•13695E+01	03	•316E-01
35	1.000	317.143	•85749	.14993E+01	•15000E+01	05	.338E-01
35							
	1.000	322.120	•87095	• 16743E+01	•16751E+01	05	.366E-01
7	1.000	323.150	.87373	•17122E+01	•17131E+01	05	-372E-01
25	1.000	323.150	•87373	•17130E+01	.17131E+01	00	.372E-01
35	1.000	327.660	•88593	•18861E+01	.18870E+01	05	.399E-01
25	1.000	333.150	•90077	.21164E+01	•21158E+01	.03	.435E-01
35	1.000	333.545	•90184	•21331E+01	•21330E+01	.00	.437E-01
35						04	.467E-01
	1.000	337.944	•91373	•23309E+01	.23318E+01		
35	1.000	342.679	•92654	•25606E+01	.25609E+01	01	.501E-01
25	1.000	343.150	•92781	.25862E+01	•25846E+01	•06	.504E-01

Table 1. (Continued).

ID	Weight	Temp. K	T/Tc	Po(expt) MPa	Po(calc) MPa	Diff.	dP _O /dT MPa/K
35 7 25 25 35 25 35 25 25 25 25 25 25 25 25 25 25 25 25 25	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	347.773 348.150 348.150 353.150 353.423 357.564 358.150 362.826 363.150 365.150 366.130 367.150 367.583 368.150 369.150 369.650 369.750	.94031 .94133 .94133 .95485 .95558 .96678 .96837 .98101 .98188 .98729 .98729 .98994 .99270 .99387 .99540 .99811 .99946 .99973	.28265E+01 .28485E+01 .28486E+01 .31309E+01 .31451E+01 .33962E+01 .37371E+01 .37633E+01 .39018E+01 .40450E+01 .40727E+01 .41185E+01 .41935E+01 .42316E+01	•28259E+01 •28463E+01 •28463E+01 •31281E+01 •31441E+01 •33948E+01 •37373E+01 •37594E+01 •38983E+01 •39681E+01 •40423E+01 •40742E+01 •41165E+01 •41236E+01 •42316E+01	.02 .08 .08 .09 .03 .04 .11 01 .10 .09 04 .07 04 .05 .02	.540E-01 .543E-01 .543E-01 .585E-01 .587E-01 .625E-01 .630E-01 .679E-01 .707E-01 .720E-01 .734E-01 .751E-01 .772E-01 .788E-01
1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2	0.000 0.000	105.350 108.250 112.450 115.750 119.250 124.350 128.350 132.850 139.150 144.350 149.950 158.150 164.750 94.540 99.780 105.150 110.650 117.420 127.720 134.150 143.740 155.720 162.450 178.650 229.750 230.250 230.850 234.750 242.300 250.050 210.330 216.410 216.470 221.640	.28485 .29269 .30404 .31296 .32243 .33622 .34703 .35920 .37623 .39029 .40543 .42761 .44545 .25562 .26979 .28430 .29918 .31748 .34533 .36271 .38864 .42104 .43923 .46933 .48303 .62120 .62255 .62417 .63472 .65513 .67608 .56869 .58513 .58529 .59927	• 13330E-06 • 26660E-06 • 66660E-05 • 26660E-05 • 66660E-05 • 13330E-04 • 26660E-04 • 13330E-04 • 26660E-03 • 66660E-03 • 66660E-03 • 13330E-02 • 68500E-08 • 30650E-07 • 12190E-06 • 43650E-06 • 17800E-05 • 11360E-04 • 31250E-04 • 11960E-03 • 50660E-03 • 10390E-02 • 29920E-02 • 45700E-02 • 11426E+00 • 11599E+00 • 11599E+00 • 13999E+00 • 18238E+00 • 26944E+00 • 36837E-01 • 50822E-01 • 65835E-01	.10921E-06 .22667E-06 .60685E-06 .12453E-05 .25447E-05 .66588E-05 .13346E-04 .27600E-04 .14057E-03 .28069E-03 .69949E-03 .13538E-02 .46579E-08 .23579E-07 .10368E-06 .40193E-06 .17616E-05 .12000E-04 .33703E-04 .12989E-03 .53976E-03 .10830E-02 .29962E-02 .45409E-02 .29561E-01 .97716E-01 .10035E+00 .11887E+00 .11887E+00 .11887E+00 .21824E+00 .21824E+00 .236599E-01 .50632E-01 .65504E-01	22.06 17.61 9.85 7.04 4.77 .1112 -3.40 -4.64 -5.17 -5.02 -4.70 -1.54 47.06 29.99 17.58 8.60 1.05 -5.33 -7.28 -7.92 -6.14 -4.0614 -4.0614 -4.0614 -4.0614 -4.0614 -4.0614 -4.0614 -4.061464 19.57 18.77 17.77 12.48 23.46 .65 .42 .37 .51	.283E-07 .554E-07 .136E-06 .263E-06 .503E-06 .120E-05 .224E-05 .429E-05 .979E-05 .181E-04 .733E-04 .129E-03 .153E-08 .688E-08 .270E-07 .936E-07 .936E-07 .360E-06 .204E-05 .512E-05 .169E-04 .586E-04 .107E-03 .254E-03 .427E-02 .435E-02 .444E-02 .506E-02 .644E-02 .808E-02 .259E-02 .258E-02 .259E-02 .318E-02
4 4 4 4 4 4 4 4 4	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	227.250 231.080 235.040 235.090 242.730 249.070 256.290 267.280 272.120 275.630 282.670	.61444 .62479 .63550 .63564 .65629 .67344 .69296 .72267 .73576 .74525	.85753E-01 .10181E+00 .12050E+00 .12082E+00 .16520E+00 .21041E+00 .27238E+00 .39303E+00 .45903E+00 .50529E+00	.85335E-01 .10138E+00 .12034E+00 .12060E+00 .16493E+00 .21043E+00 .27326E+00 .39490E+00 .45972E+00 .51145E+00	.49 .42 .13 .18 .16 01 32 47 15 -1.21	.391E-02 .447E-02 .511E-02 .512E-02 .652E-02 .786E-02 .958E-02 .126E-01 .142E-01 .153E-01

Table 1. (Continued).

	(20) Buil Cit,	(ZJ) Hollids,	(50)110434, (JJ/KI 412KO, (7071	erchillann, (00) mer	mar Loops.	
ID	Weight	Temp.	T/T _C	Pa(expt)	P _o (calc)	Diff.	dPa/dT
		K		MPa	MPa	76	MPa/K
4	0.000	283.300	•76599	.63648E+00	•63942E+00	46	.181E-01
4	0.000	291.080	.78702	.78607E+00	•79193E+00	74	2125-01
4	0.000	298.080	•80595	•94352E+00	•95059E+00	74	-242E-01
4	0.000	307.090	.83031	•11644E+01	•11876E+01	-1.95	.285E-01
4	0.000	315.210	.85226	•14232E+01	•14358E+01	87	•327E-01
4	0.000	323.490	•87465	•17023E+01	•17258E+01	-1.36	.374E-01
4	0.000	323.490	•87465	.17065E+01	•17258E+01	-1.12	.374E-01
6	0.000	293.930	•79473	.86180E+00	.85398E+00	•92	.224E-01
6	0.000	301.090	.81409	•10352E+01	•10255E+01	•94	.256E-01
6	0.000	307.480	.83136	.12066E+01	•10255E+01	•66	.287E-01
6	0.000	313.320	.84715	•13790E+01	•13749E+01	•30	.317E-01
6	0.000	318.590	.86140	•15513E+01	•15494E+01	• 12	•346E-01
6	0.000	323.370	.87433	•17237E+01	•17213E+01	.14	.373E-01
6	0.000	327.930	.88666	.18961E+01	.18978E+01	09	.401E-01
6	0.000	332.090	.89790	•20684E+01	•20701E+01	08	.428E-01
6	0.000	336.090	•90872	•22408E+01	•22464E+01	25	.454E-01
6	0.000	339.870	•91894	•24132E+01	•24231E+01	41	.481E-01
6	0.000	343.480	92870	•25855E+01	.26013E+01	61	•507E-01
6	0.000	346.930	.93803	•27579E+01	•27807E+01	82	.533E-01
6	0.000	350.090	•94657	•29303E+01	.29532E+01	78	•559E-01
6	0.000	353.090	•95468	•31026E+01	•31246E+01	70	•584E-01
6	0.000	355.870	.96220	•32750E+01	•32903E+01	47	.609E-01
6	0.000	358.590	•96956	•34474E+01	•34594E+01	35	.635E-01
6	0.000	361.260	.97677	•36197E+01	•36324E+01	35	.662E-01
6	0.000	363.760	•98353	•37921E+01	-38012E+01	24	.690E-01
6	0.000	366.260	•99029	•39645E+01	•39775E+01	~.33	•721E-01
6	0.000	368.760	•99705	•41369E+01	•41627E+01	62	.763E-01
11	0.000	301.950	.81641	.10536E+01	•10477E+01	•56	.260E-01
11	0.000	302.950	.81912	•10807E+01	•10739E+01	.63	.265E-01
11	0.000	304.610	.82360	•11248E+01	.11185E+01	. 56	.273E-01
11	0.000	306.680	.82920	.11829E+01	.11760E+01	•59	.283E-01
11	0.000	308.350	.83372	.12317E+01	.12239E+01	.64	.291E-01
11	0.000	311.490	.84221	•13246E+01	•13178E+01	•52	.307E-01
11	0.000	311.490	.84221	•13249E+01	•13178E+01	•54	.307E-01
11	0.000	315.480	.85299	.14500E+01	•14446E+01	.37	.329E-01
11	0.000	318.150	•86021	•15471E+01	• 15343E+01	•84	.343E-01
11	0.000	318.280	.86057	•15474E+01	•15388E+01	•56	.344E-01
11	0.000	324.940	.87857	•17798E+01	•17806E+01	05	.383E-01
11	0.000	330.600	•89388	•20098E+01	•20071E+01	•13	.418E-01
11	0.000	330,600	•89388	.20107E+01	.20071E+01	. 18	.418E-01
11	0.000	333.960	•90296	.21596E+01	.21512E+01	•39	.440E-01
11	0.000	336.650	。91023	•22749E+01	•22720E+01	. 13	.458E-01
11	0.000	340.120	•91962	•24561E+01	•24351E+01	.86	•482E-01
11	0.000	340.120	•91962	.24539E+01	•24351E+01	•77	.482E-01
11	0.000	344.640	•93184	•26778E+01	•26606E+01	•65	.516E-01
11	0.000	348.240	•94157	•28709E+01	•28512E+01	•69	.544E-01
11	0.000	351.640	•95076	•30683E+01	•30408E+01	.90	.572E-01
11	0.000	358.010	•96799	•34289E+01	•34227E+01	• 18	.629E-01
11	0.000	361.120	•97640	•36292E+01	•36231E+01	• 17	.660E-01
11	0.000	361.120	•97640	•36320E+01	•36231E+01	•24	.660E-01
11	0.000	363.200	•98202	•37687E+01	•37628E+01	•16	.683E-01
11	0.000	363.450	-98270	•37828E+01	•37799E+01	•08	.686E-01
11	0.000	365.470	•98816	•39048E+01	•39209E+01	41	.711E-01
11	0.000	368.850	•99730	•41585E+01	•41696E+01	27	.765E-01
11	0.000	368.970	•99762	•41813E+01	•41787E+01	•06	.767E-01
12	0.000	313.483	.84759	•13790E+01	•13801E+01	08	•318E-01
12	0.000	332.039	.89777	•20684E+01	•20679E+01	•02	.427E-01
12	0.000	339.594	.91819	•24132E+01	•24098E+01	. 14	.479E-01
12	0.000	346.428	•93667	•27579E+01	•27540E+01	•14	•529E-01
12	0.000	352.706	•95365	•31026E+01	•31022E+01	•01	.581E-01
12	0.000	358.261	.96867	•34474E+01	•34386E+01	•26	.631E-01
12	0.000	363.594	.98309	•37921E+01	.37898E+01	.06	.688E-01
12	0.000	368.372	•99600	•41369E+01	•41332E+01	•09	.755E-01
13	0.000	303.150	•81966	•10801E+01	•10792E+01	•08	.265E-01

Table 1. (Continued).

	(20) Dai i Gii,	(2)) 111011143,	(50)110434,	(33)/KI GIZKO, (70)	icicimianii, (00)inci	mar Loops.	
ID	Weight	Temp. K	T/T _C	P _o (expt) MPa	P _σ (calc) MPa	Diff.	dP _O /dT MPa/K
		707 450		474 545 104	474745.04		
13	0.000	323.150	•87373		•17131E+01	.14	•372E-01
14	0.000	323.150	.87373		•17131E+01	. 14	•372E-01
14	0.000	333.150	•90077		•21158E+01	•18	•435E-01
14	0.000	343.150	.92781		.25846E+01	-24	.504E-01
14	0.000	348.150	•94133		•28463E+01	.24	•543E-01
14	0.000	353.150	• 95485		•31281E+01	•35	•585E-01
14	0.000	358.150	•96837	•34400E+01	•34316E+01	•.25	•630E-01
14	0.000	363.150	•98188	•37683E+01	•37594E+01	•24	•683E-01
14	0.000	368.150	•99540	•41239E+01	.41165E+01	•18	•751E − 01
17	0.000	277.594	• 75056	• 54470E+00	•54223E+00	•46	•160E-01
17	0.000	283.150	.76558	•63980E+00	•63671E+00	.48	.180E-01
17	0.000	288.706	.78060	•74330E+00	•74284E+00	•06	.202E-01
17	0.000	294.261	•79562	.86180E+00	.86141E+00	•05	.225E-01
17	0.000	299.817	.81064	•99350E+00	•99332E+00	.02	.250E-01
17	0.000	305.372	.82566		.11394E+01	•03	.276E-01
17	0.000	310.928	.84069	•13010E+01	•13006E+01	•03	.304E-01
17	0.000	316.483	.85571	•14789E+01	•14778E+01	•07	•334E-01
17	0.000	322.039	.87073	•16734E+01	•16721E+01	.08	-366E-01
17	0.000	327.594	.88575		•18844E+01	.07	-399E-01
17	0.000	333.150	•90077		.21158E+01	. 14	-435E-01
17	0.000	338.706	.91579		.23676E+01	.18	•472E-01
17	0.000	344.261	.93081		.26411E+01	. 19	•513E-01
17	0.000	349.817	•94583		•29380E+01	.18	•556E-01
17	0.000	355.372	96085		•32601E+01	.16	•604E-01
17	0.000	360.928	•97588		•36105E+01	•22	•658E-01
19	0.000	314.817	.85120		•14229E+01	-1.16	•325E-01
19	0.000	330.372	•89326		•19976E+01	1.48	•416E-01
19	0.000	345.372	•93382		•26985E+01	1.69	•521E-01
19	0.000		•96686		•33967E+01	•27	•625E-01
20	0.000	148.950	•40273		•24915E-03	60.54	•299E-04
20	0.000	154.850	•41868		•49082E-03	62.99	•540E-04
20	0.000	163.950	•44329		.12537E-02	59.53	.121E-03
20	0.000	172.650	•44529		• 12537E=02 • 27678E=02	44.52	• 121E-03
20		172.850	•48628			33.56	.390E-03
20	0.000	190.350			.49909E-02		
20	0.000	196.850	•51467		•10768E-01	23.81	•739E-03
20	0.000		• 53224 • 54630		• 16540E-01 • 22794E-01	20.91	•105E-02
20	0.000	202.050				16.98	•136E-02
20	0.000	210.250	• 56847		•36439E-01	9.76	• 199E-02
	0.000	215.450	•58253		.48044E-01	11.00	•248E-02
20 20	0.000	219.950	• 59470		.60306E-01	10.54	• 298E-02
20	0.000	223.750	.60497		•72482E-01	10.36	•344E-02
20	0.000	225.550	•60984		.78886E-01	9.85	•368E-02
20	0.000	227.050	•61390		-84556E-01	10.37	•388E-02
20	0.000	228.050	.61660		.88509E-01	9.96	.402E-02
30	0.000	229.050	•61931		.92606E-01	9.42	•417E-02
30	0.000	334.780	.90518		.21875E+01	• 58	.445E-01
	0.000	337.360	.91215		•23047E+01	•60	.463E-01
30 30		340.510	.92067		•24540E+01	•45	.485E-01
	0.000	346.730	.93749		•27700E+01	•66	•532E-01
30	0.000	350.470	•94760		.29745E+01	.71	•562E-01
30	0.000	353.620	.95612		•31556E+01	•30	.589E-01
30	0.000	357.820	•96747		•34108E+01	•39	.627E-01
30	0.000	362.280	.97953		•37004E+01	.79	.673E-01
30	0.000	365.570	.98843		•39281E+01	•66	.712E-01
30	0.000	367.850	.99459		.40941E+01	•53	.746E-01
30	0.000	369.740	.99970		•42387E+01	•36	•793E-01
78	0.000	324.754	•87807		•17735E+01	04	.382E-01
78	0.000	328.078	.88706		•19037E+01	•02	-402E-01
78	0.000	331.356	.89592		•20389E+01	•02	•423E-01
78	0.000	333.900	•90280		•21486E+01	•05	-439E-01
78	0.000	335.669	•90758		•22274E+01	•02	.451E-01
78	0.000	337.878	.91355		•23288E+01	01	.467E-01
78	0.000	340.292	•92008		•24434E+01	01	.484E-01
78	0.000	342.939	.92724	•25742E+01	.25740E+01	.01	•503E-01

Table 1. (Continued).

ID	Weight	Temp. K	T/T _C	P _o (expt) MPa	Po(calc) MPa	Diff. %	dP _O /dT MPa/K
78	0.000	345.115	.93312	.26870E+01	•26852E+01	.07	.519E-01
78	0.000	348.087	.94116	-28434E+01	.28429E+01	•02	.542E-01
78	0.000	350.680	.94817	•29866E+01	•29863E+01	•01	.564E-01
78	0.000	352.559	•95325	•30930E+01	•30937E+01	02	.579E-01
78	0.000	354.824	•95937	•32279E+01	•32271E+01	•02	.599E-01
78	0.000	358.141	•96834	•34310E+01	.34310E+01	• 00	.630E-01
78	0.000	363.426	•98263	•37776E+01	•37783E+01	02	.686E-01

Number of data points used in fit = 81; rms pressure deviation = 0.056%.

Table 2. Comparisons of saturated liquid density data with eq (3).

Data sources and ID numbers: (1)Maass, (2)Van der Vet, (3)NGAA, (4)Sage, (6)Reamer, (7)Clegg, (8)Francis, (11)Seeman, (12)Helgeson, (13)Klosek, (14)Shana'a, (15)Jensen, (16)Sliwinski, (17)Tomlinson, (18)Kahre, (19)Rodosevich, (20)Haynes, (21)Deschner, (22)Orrit, (23)McClune, (24)Ely, (25)Thomas, (34)Carney, (36)Dana.

10	Weight	Temp.	$(T_c-T)/(T_c-T_+)$	Density	(expt)	Density (calc)	Diff.	dp ₀ /dT
	3	K		mol/L	kg/m ³	kg/m3	Ø,	kg/(m3•K)
22 22 22 19 23 22 23 19 20 22 23 20 22 23 19 20 22 23 20 22 23 20 22 23 20 22 23 20 22 23 20 22 23 20 20 20 20 20 20 20 20 20 20 20 20 20	Weight 1.000	86.650 90.100 91.010 93.150 96.040 98.150 100.010 100.075 100.980 103.150 105.075 106.170 108.150 108.150 108.150 110.075 111.520 113.150 115.000 115.075 116.860 118.150 120.075 122.270 123.150 125.075 127.660 128.150	.99585 .98372 .98052 .97299 .96283 .95541 .94864 .94546 .93783 .93106 .92721 .92025 .92025 .92025 .92025 .92025 .92025 .91348 .90840 .90267 .89616 .89590 .88962 .88508 .87831 .87060 .86750 .86073 .86164 .84992	mol/L 16.607 16.522 16.485 16.442 16.385 16.331 16.291 16.307 16.272 16.217 16.187 16.152 16.096 16.105 16.101 16.072 16.028 15.985 15.946 15.956 15.960 15.870 15.841 15.782 15.755 15.725 15.660 15.639	732.32 728.57 726.96 725.05 722.52 720.17 718.41 719.07 717.54 715.11 713.81 712.25 709.78 710.17 709.99 708.72 706.79 704.89 703.19 703.60 701.43 699.82 698.55 695.96 694.73 693.43 690.55 689.62	732.12 728.57 727.64 725.44 722.48 720.33 718.43 718.36 717.44 715.22 713.26 712.15 710.14 710.14 710.14 710.14 708.18 706.71 705.06 703.18 703.11 701.30 699.99 698.04 695.82 694.93 692.98 690.36 689.87	.03000905 .010200 .10 .0102 .08 .0105 .0002 .08 .0105 .0002 .08 .0105 .0002 .08 .0105 .0002 .08 .0105 .0002 .08 .0105 .0002 .08 .0105 .0002 .08 .0102 .08 .0102 .08 .0102 .00 .07 .0202 .07 .0203 .06 .0304	-1.0301 -1.0273 -1.0266 -1.0250 -1.0250 -1.0205 -1.0205 -1.0199 -1.0188 -1.0173 -1.0164 -1.0164 -1.0164 -1.0151 -1.0151 -1.0145 -1.0139 -1.0135 -1.0132 -1.0122 -1.0121 -1.0121
19 20 22 23 20 22 23 20 22 23 20 22 23 20 23 20 23 22 20 23 22 20 23 22 20 23 22 20 23 22 20 23 22 20 23 22 20 23 22 20 23 22 23	1.000 1.000	115.000 115.075 116.860 118.150 120.075 122.270 123.150 125.075 127.660 128.150 130.075 133.130 133.150 135.075 138.430 140.075 143.890 145.075 143.890 145.075 143.890 145.075 143.890 145.075 148.150 149.610 150.075 153.150 150.075 150	.89616 .89590 .88962 .88508 .87831 .87060 .86750 .86073 .85164 .84992 .84315 .83241 .83234 .82557 .81475 .81377 .80799 .79717 .79457 .79040 .77959 .77446 .77282 .76201 .75522 .74443 .73602 .72684 .71749 .71703 .70926 .69780	15.946 15.956 15.906 15.870 15.841 15.782 15.755 15.725 15.660 15.639 15.609 15.531 15.524 15.491 15.411 15.408 15.375 15.296 15.282 15.259 15.182 15.140 15.067 15.067 15.025 14.898 14.834 14.776 14.772 14.718 14.659	703.19 703.60 701.43 699.82 698.55 695.96 694.73 693.43 690.55 689.62 688.29 684.89 684.56 683.11 679.60 679.45 678.00 674.50 673.87 669.46 668.00 667.63 664.42 662.55 659.29 656.98 654.15 651.60 651.40 649.02 646.40	703.18 703.11 701.30 699.99 698.04 695.82 694.93 692.98 690.36 689.87 687.92 684.83 684.81 682.86 679.74 679.46 677.79 674.67 673.92 672.72 669.60 668.11 667.64 664.51 662.54 659.40 656.96 654.28 651.55 651.42 649.14 645.77	.00 .07 .0202 .07 .0203 .06 .0304 .05 .0104 .0402000301 .02020001 .0002 .0002 .010002 .0100	-1.0140 -1.0139 -1.0135 -1.0132 -1.0128 -1.0121 -1.0121 -1.0123 -1.0123 -1.0123 -1.0136 -1.0145 -1.0148 -1.0152 -1.0175 -1.0172 -1.0175 -1.0191 -1.0224 -1.0224 -1.0224 -1.0228 -1.0286 -1.0381 -1.0388 -1.0341
23 24 22 24 22 24 22 24 22 20 24 22	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	173.150 176.472 182.340 184.294 187.800 191.936 193.300 198.748 198.890 200.000 204.329 204.540	.69168 .68000 .65936 .65249 .64016 .62562 .62082 .60167 .60117 .59726 .58204	14.595 14.525 14.385 14.340 14.254 14.155 14.120 13.991 13.986 13.956 13.857 13.847	643.59 640.50 634.33 632.34 628.55 624.21 622.67 616.96 616.72 615.42 611.06 610.62	643.97 640.53 634.40 632.35 628.66 624.28 622.83 617.00 616.85 615.66 610.97 610.75	06 00 01 00 02 01 03 01 02 04 .01	-1.0360 -1.0399 -1.0475 -1.0556 -1.0623 -1.0647 -1.0747 -1.0750 -1.0771 -1.0860 -1.0865

Table 2. (Continued).

Data sources and ID numbers: (1) Maass, (2) Van der Vet, (3) NGAA, (4) Sage, (6) Reamer, (7) Clegg, (8) Francis, (11) Seeman, (12) Helgeson, (13) Klosek, (14) Shana'a, (15) Jensen, (16) Sliwinski, (17) Tomlinson, (18) Kahre, (19) Rodosevich, (20) Haynes, (21) Deschner, (22) Orrit, (23) McClune, (24) Ely, (25) Thomas, (34) Carney, (36) Dana.

ID	Weight	Temp.	$(T_c-T)/(T_c-T_t)$	Density	(expt)	Density (calc)	Diff.	dp ₀ /dT
		K		mol/L	kg/m ³	kg/m ³	%	kg/(m³•K)
22	1.000	210.020	• 56203	13.710	604.59	604.76	03	-1.0989
24	1.000	211.320	•55746	13.696	603.95	603.33	.10	-1.1020
22	1.000	216.020	• 54093	13.559	597.92	598.12	03	-1.1138
24	1.000	218.200	•53327	13.517	596.04	595.69	•06	-1.1196
22	1.000	222.040	. 51976	13.405	591.12	591.37	04	-1.1303
24	1.000	225.876	•50627	13.315	587.17	587.01	.03	-1.1418
22	1.000	227.360	•50105	13.268	585.06	585.31	04	-1.1464
24	1.000	231.875	•48518	13.169	580.71	580 • 10	.11	-1.1611
22	1.000	232.910	•48154	13.120	578.56	578.90	06	-1.1647
24	1.000	235.183	•47355	13.073	576.47	576.24	.04	-1.1726
22	1.000	235.610	•47204	13.051	575.49	575.74	04	-1.1742
22	1.000	238.400	•46223	12.975	572.14	572.45	05	-1.1844
20	1.000	240.000	•45661	12.927	570.05	570.55	09	-1.1905
22	1.000	241.180	•45246	12.903	568.98	569.14	03	-1.1951
22	1.000	243.980	•44261	12.829	565.70	565.78	01	-1.2063
24	1.000	246.260	•43459	12.773	563.27	563.02	.04	-1.2159
24	1.000	247.555	•43004	12.742	561.87	561.44	•08	-1.2215
24	1.000	249.523	•42312	12.689	559.53	559.03	•09	-1.2301
24	1.000	257.991	•39334	12.446	548.84	548.44	• 07	-1.2709
25	1.000	258.150	•39278	12.415	547.47	548.24	14	-1.2717
25	1.000	263.150	•37520	12.270	541.07	541.82	14	-1.2987
24	1.000	267.737	•35907	12.155	536.01	535.80	.04	-1.3255
25	1.000	268.150	•35762	12.126	534.72	535.25	10	-1.3281
20	1.000	270.000	.35111	12.073	532.40	532.78	07	-1.3396
25	1.000	273.150	•34004	11.982	528.37	528.53	03	-1.3601
24	1.000	277.971	•32309	11.837	521.97	521.90	•01	-1.3939
25	1.000	278.150	•32246	11.828	521.58	521.65	01	-1.3952
20	1.000	280.000	•31595	11.762	518.68	519.05	07	-1.4090
25	1.000	283.150	•30487	11.670	514.61	514.57	•01	- 1.4337
16	1.000	283.200	•30470	11.663	514.30	514.50	04	-1.4341
24	1.000	287.784	• 28858	11.518	507.93	507.84	•02	-1.4729
25	1.000	288.150	•28729	11.507	507.43	507.30	.02	-1.4762
25								
16	1.000	293.150 293.190	•26971	11.338	499.97	499.81	• 03	-1.5232
25	1.000 1.000	298.150	•26957	11.336	499.90 492.30	499.74	• 03	-1.5236 -1.5757
16			•25213	11.164		492.06	•05	
	1.000	303.150	•23455	10.983	484.30	484.04	•05	-1.6345
25	1.000	303.150	•23455	10.981	484.23	484.04	•04	-1.6345
16	1.000	313.120	.19949	10.600	467.44	467.07	•08	-1.7764
25	1.000	313.150	• 19938	10.586	466.81	467.01	04	-1.7769
16	1.000	323.120	•16432	10.176	448.73	448.40	.07	-1.9663
25	1.000	323.150	•16422	10.172	448.56	448.34	•05	-1.9670
16	1.000	333.110	.12919	9.714	428.36	427.50	•20	-2.2360
25	1.000	333 • 150	•12905	9.696	427.57	427.41	•04	-2.2373
16	1.000	343.080	•09413	9.157	403.78	403.28	• 12	-2.6587
25	1.000	343.150	•09389	9.144	403.22	403.09	•03	-2.6626
16	1.000	348.080	•07655	8.838	389.74	389.22	- 13	-2.9840
25	1.000	348.150	•07631	8.825	389.16	389.01	• 04	-2.9894
16	1.000	353.090	•05894	8.469	373.45	373.16	•08	-3.4619
25	1.000	353.150	•05872	8.458	372.97	372.95	.01	-3.4691
16	1.000	358.100	•04132	8.022	353.75	354.02	08	-4.2536
25	1.000	358.150	•04114	8.020	353.66	353.81	04	-4.2643
16	1.000	363.110	•02370	7.459	328.90	329.17	08	-5.9214
25	1.000	363.150	•02356	7.450	328.52	328.93	12	-5.9427
25	1.000	365.150	•01653	7.146	315.12	315.75	20	-7.3726
25	1.000	367.150	.00949	6.756	297.92	298.45	18	-10.3851
16	1.000	368.100	•00615	6.488	286.10	287.23	39	-13.6269
25	1.000	368.150	• 00598	6.485	285.97	286.54	20	-13.8779
16	0.000	369.100	•00264	6.080	268.10	269.86	65	-23.3214
25	1.000	369.150	•00246	6.082	268.20	268.67	18	-24.3714
16	0.000	369.600	•00088	5.669	250.00	253.99	-1.57	-47.1839
1	0.000	194.950	•61502	14.146	623.80	621.07	.44	-1.0676

Table 2. (Continued).

Data sources and ID numbers: (1) Maass, (2) Van der Vet, (3) NGAA, (4) Sage, (6) Reamer, (7) Clegg, (8) Francis, (11) Seeman, (12) Helgeson, (13) Klosek, (14) Shana'a, (15) Jensen, (16) Sliwinski, (17) Tomlinson, (18) Kahre, (19) Rodosevich, (20) Haynes, (21) Deschner, (22) Orrit, (23) McClune, (24) Ely, (25) Thomas, (34) Carney, (36) Dana.

ID	Weight	Temp.	$(T_c-T)/(T_c-T_+)$	Density	(expt)	Density (calc)	Diff.	dp ₀ /dT
		K		mol/L	kg/m3	kg/m³	Z	kg/(m3 _• K)
1	0.000	204.850	•58021	13.888	612.40	610.41	• 33	-1.0872
1	0.000	209.950	.56228	13.749	606.30	604.84	•24	-1.0987
1	0.000	213.650	•54927	13.656	602.20	600.75	•24	-1.1077
i	0.000	214.450	•54645	13.636	601.30	599.87	•24	-1.1097
i	0.000	219.850	•52746	13.509	595.70	593.84	.31	-1.1241
i	0.000	225.200	.50865	13.361	589.20	587.78	.24	-1.1397
i	0.000	227.250	•50144	13.309	586.90	585.44	•25	-1.1461
i	0.000	230.750	.48913	13.223	583.10	581.41	•29	-1.1574
i	0.000	234.450	.47612	13.114	578.30	577.10	.21	-1.1700
i	0.000	238.800	•46083	13.005	573.50	571.98	•27	-1.1859
1	0.000	243.050	•44588	12.892	568.50	566.90	. 28	-1.2026
1	0.000	248.650	•42619	12.733	561.50	560.10	•25	-1.2263
2	0.000	283.150	•30487	11.679	515.00	514.57	.08	-1.4337
2	0.000	293.150	•26971	11.348	500.40	499.81	•12	-1.5232
2	0.000	298.150	•25213	11.178	492.90	492.06	.17	-1.5757
2	0.000	303.150	•23455	10.994	484.80	484.04	.16	-1.6345
2	0.000	308.150	•21696	10.813	476.80	475.70	•23	
2	0.000	313.150	.19938	10.608		467.01	٠25	-1.7010 1.7760
2					467.80			-1.7769
2	0.000	318.150	. 18180	10.409	459.00	457.91	•24	-1.8645
4	0.000	323.150	.16422	10.182	449.00	448.34	.15	-1.9670
2 2 2 2 2 2 3 3	0.000	230.706	.48929	13.203	582.20	581.46	• 13	-1.1572
5	0.000	233.928	.47796	13.117	578.40	577.71	•12	-1.1682
3 3	0.000	238.539	.46174	12.992	572.90	572.29	- 11	-1.1849
5	0.000	241.817	•45022	12.903	569.00	568.38	•11	-1.1976
3	0.000	245.817	•43615	12.815	565.10	563.56	•27	-1.2140
3	0.000	248.594	•42639	12.713	560.60	560.17	•08	-1.2260
3	0.000	252.761	•41173	12.599	555.60	555.02	• 10	-1.2451
3	0.000	255.372	.40255	12.522	552.20	551.76	.08	-1.2577
3	0.000	255.483	•40216	12.520	552.10	551.62	• 09	-1.2582
3	0.000	266.483	•36348	12.209	538.40	537.46	. 18	-1.3180
3	0.000	277.150	•32597	11.883	524.00	523.04	. 18	-1.3879
3	0.000	288.706	•28534	11.504	507.30	506 • 48	•16	-1.4812
3	0.000	299.817	.24627	11.125	490.60	489.42	•24	-1.5945
3	0.000	310.928	.20719	10.708	472.20	470.92	•27	-1.7418
3	0.000	322.039	.16812	10.273	453.00	450.52	• 55	-1.9427
3	0.000	333.150	.12905	9.783	431.40	427.41	•93	-2.2373
4	0.000	293.928	• 26697	11.405	502.93	498.62	.87	-1.5310
4	0.000	301.094	•24178	11.143	491.36	487.37	.82	-1.6094
4	0.000	307.483	•21931	10.899	480.60	476.83	.79	-1.6916
4	0.000	313.317	.19879	10.675	470.72	466.72	.86	-1.7796
4	0.000	318.594	. 18024	10.465	461.49	457.09	•96	-1.8729
4	0.000	323.371	•16344	10.276	453.14	447.91	1.17	-1.9719
4	0.000	327.928	• 14742	10.088	444.84	438.68	1.40	-2.0831
4	0.000	332.094	.13277	9.903	436.71	429.75	1.62	-2.2033
4	0.000	336.094	.11870	9.705	427.96	420.67	1.73	-2.3410
4	0.000	339.872	.10542	9.504	419.11	411.54	1.84	-2.4978
4	0.000	343.483	•09272	9.298	409.99	402.20	1.94	-2.6811
4	0.000	346.928	.08060	9.088	400.76	392.61	2.08	-2.8988
4	0.000	350.094	.06947	8.884	391.75	383.04	2.27	-3.1522
4	0.000	353.094	.05892	8.668	382.21	373.14	2.43	-3.4624
4	0.000	355.872	.04915	8.456	372.87	363.02	2.71	-3.8440
4	0.000	358.594	•03958	8.228	362.82	351.89	3.10	-4.3622
4	0.000	361.261	.03020	7.973	351.59	339.33	3.61	-5.1198
4	0.000	363.761	.02141	7.708	339.88	325.19	4.52	-6.2966
4	0.000	366.261	.01262	7.406	326.58	306.88	6.42	-8.7034
4	0.000	368.761	•00383	7.009	309.06	276.85	11.63	-18.3934
6	0.000	313.480	• 19822	10.609	467.82	466.43	•30	-1.7822
6	0.000	324.480	.15954	10.009	447.20	445.71	•33	-1.9973
6	0.000	332.040	• 13296	9.778	447.20	429.87	•33	-2.2016
6	0.000	339.590	.10641	9.778	414.31	412.25	•50	-2.4850
6	0.000	346.430	.08235	8.975	395.75	394.04	•43	-2.8642
6	0.000	352.710	.06027	8.524	375.88	374.46	•45	-3.4178
O	0.000	2220110	•00027	0.024	217.00	2/4.40	٥٠.	-5.4170

Table 2. (Continued).

Data sources and ID numbers: (1) Maass, (2) Van der Vet, (3) NGAA, (4) Sage, (6) Reamer, (7) Clegg, (8) Francis, (11) Seeman, (12) Helgeson, (13) Klosek, (14) Shana'a, (15) Jensen, (16) Sliwinski, (17) Tomlinson, (18) Kahre, (19) Rodosevich, (20) Haynes, (21) Deschner, (22) Orrit, (23) McClune, (24) Ely, (25) Thomas, (34) Carney, (36) Dana.

ID	Weight	Temp.	$(T_c-T)/(T_c-T_t)$	Density	(expt)	Density (calc)	Diff.	Tb/gqb
		K		mol/L	kg/m3	kg/m ³	%	kg/(m3 _* K)
		1		111017	1197 111-	Ng/ III-	p	Ng/ (III)
6	0.000	358.260	•04076	8.036	354.37	353.34	. 29	-4.2880
6	0.000	363.590	.02201	7.471	329.46	326.26	.98	-6.1918
6	0.000	368.370	.00520	6.632	292.45	283.35	3.21	-15.1457
7	0.000	323.150	.16422	10.150	447.59	448.34	17	-1.9670
7	0.000	333.150	.12905	9.550	421.13	427.41	-1.47	-2.2373
7	0.000	343.150	•09389	8.980	395.99	403.09	-1.76	-2.6626
7	0.000	348 • 150	•07631	8.630	380.56			
7						389.01	-2.17	-2.9894
7	0.000	353-150	.05872	8.300	366.01	372.95	-1.86	-3.4691
	0.000	358.150	.04114	7.860	346.60	353.81	-2.04	-4.2643
7	0.000	363.150	.02356	7.320	322.79	328.93	-1.87	-5.9427
	0.000	368-150	.00598	6.410	282.66	286.54	-1.35	-13.8779
8	0.000	293.150	•26971	11.350	500.50	499.81	.14	-1.5232
11	0.000	278.160	•32242	11.851	522.60	521.63	• 19	-1.3953
11	0.000	283.140	•30491	11.686	515.30	514.59	•14	-1.4336
11	0.000	286.150	. 29432	11.586	510.90	510.24	. 13	-1.4587
11	0.000	289.160	•28374	11.482	506.30	505.81	-10	-1.4853
11	0.000	293.150	.26971	11.342	500.15	499.81	.07	-1.5232
11	0.000	295.150	.26268	11.271	497.00	496.74	•05	-1.5435
11	0.000	297.150	•25564	11.200	493.90	493.63	•05	-1.5647
11	0.000	299.180	•24851	11.125	490.60	490.43	•03	-1.5872
12	0.000	277.594	•32441	11.891	524.34	522.42	• 37	-1.3911
12	0.000	283.150	•30487	11.718	516.73	514.57	.42	-1.4337
12	0.000	288.706	• 28 5 3 4	11.532	508.52	506.48	• 40	-1.4812
12	0.000	294.261	•26580	11.345	500.27	498.11	•43	-1.5344
12	0.000	299.817	• 24627	11.139	491.21	489.42	•37	-1.5945
12	0.000	305.372	•22673	10.935	482.19	480.37	•38	-1.6630
12	0.000	310.928	•20719	10.722	472.80	470.92	• 40	-1.7418
12	0.000	316.483	.18766	10.484	462.29	461.00	•28	-1.8338
12	0.000	322.039	.16812	10.241	451.60	450.52	•24	-1.9427
12	0.000	327.594	• 14859	9.985	440.31	439.37	.21	-2.0742
12	0.000	333.150	. 12905	9.713	428.30	427.41	•21	-2.2373
12	0.000	338.706	•10952	9.423	415.52	414.43	•27	-2.4461
12 12	0.000	344.261	.08998	9.095	401.06	400.10	•24	-2.7261
12	0.000	349.817 355.372	•07044 •05091	8.697 8.235	383.49	383.91	11 49	-3.1274
12	0.000	360.928	.03137	7.757	363.15 342.06	364.92	•31	-3.7665 -5.0051
13	0.000	88.706	.98862	16.542		341.01	08	-1.0284
13	0.000	94.261	•96909	16.420	729.45 724.07	730.00 724.30	03	-1.0242
13	0.000	99.817	•94955	16.296	718.61	718.62	00	-1.0206
13	0.000	105.372	•93002	16.168	712.95	712.96	00	-1.0176
13	0.000	110.928	•91048	16.042	707.39	707.32	•01	-1.0176
13	0.000	116.483	•89095	15.914	701.76	701.68	•01	-1.0136
13	0.000	122.039	.87141	15.787	696.16	696.05	•02	-1.0125
13	0.000	127.594	•85187	15.656	690.37	690.43	01	-1.0121
13	0.000	133.150	.83234	15.525	684.62	684.81	03	-1.0123
15	0.000	93.150	.97299	16.446	725.20	725.44	03	-1.0250
15	0.000	103.150	.93783	16.212	714.90	715.22	05	-1.0188
15	0.000	113.150	•90267	15.967	704.10	705.06	14	-1.0145
15	0.000	123.150	.86750	15.743	694.20	694.93	10	-1.0123
15	0.000	133.150	.83234	15.516	684.20	684.81	09	-1.0123
17	0.000	278.150	•32246	11.835	521.90	521.65	.05	-1.3952
17	0.000	283.150	•30487	11.679	515.00	514.57	•08	-1.4337
17	0.000	288.150	•28729	11.513	507.70	507.30	.08	-1.4762
17	0.000	293.150	•26971	11.345	500.30	499.81	.10	-1.5232
17	0.000	298.150	•25213	11.171	492.60	492.06	.11	-1.5757
17	0.000	303.150	•23455	10.989	484.60	484.04	.12	-1.6345
17	0.000	308.150	•21696	10.803	476.40	475.70	. 15	-1.7010
17	0.000	313.150	.19938	10.608	467.80	467.01	. 17	-1.7769
18	0.000	277.550	•32457	11.850	522.55	522.48	.01	-1.3908
18	0.000	288.750	•28518	11.491	506.70	506.41	.06	-1.4816
18	0.000	299.850	•24615	11.110	489.90	489.37	.11	-1.5949
18	0.000	310.950	.20712	10.696	471.65	470.88	.16	-1.7422

Table 2. (Continued).

Data sources and ID numbers: (1)Maass, (2)Van der Vet, (3)NGAA, (4)Sage, (6)Reamer, (7)Clegg (8)Francis, (11)Seeman, (12)Helgeson, (13)Klosek, (14)Shana'a, (15)Jensen, (16)Sliwinski, (17)Tomlinson, (18)Kahre, (19)Rodosevich, (20)Haynes, (21)Deschner, (22)Orrit, (23)McClune, (24)Ely, (25)Thomas, (34)Carney, (36)Dana.

10	Weight	Temp.	$(T_c-T)/(T_c-T_t)$	Density	(expt)	Density (calc)	Diff.	dp ₀ /dT
		K		mol/L	kg/m3	kg/m ³	%	kg/(m3•K)
18	0.000	327.550	.14874	9.941	438.35	439.46	25	-2.0731
20	0.000	288.706	.28534	11.479	506.19	506.48	06	-1.4812
21	0.000	303。150	. 23455	11.017	485.82	484.04	• 37	-1.6345
21	0.000	308.150	.21696	10.851	478.50	475.70	.59	-1.7010
21	0.000	313.150	• 19938	10.692	471.49	467.01	•96	-1.7769
21	0.000	318.150	.18180	10.500	463.02	457.91	1.12	-1.8645
21	0.000	323.150	. 16422	10.302	454.29	448.34	1.33	-1.9670
21	0.000	328.150	.14663	10.075	444.28	438.21	1.38	-2.0890
21	0.000	333.150	.12905	9.842	434.00	427.41	1.54	-2.2373
21	0.000	338.150	.11147	9.570	422.00	415.78	1.50	-2.4226
21	0.000	343.150	•09389	9.252	408.00	403.09	1.22	-2.6626
21	0.000	348.150	•07631	8.896	392.30	389.01	•85	-2.9894
21	0.000	353.150	。05872	8.527	376.00	372.95	. 82	-3.4691
21	0.000	358.150	.04114	8.078	356.20	353.81	•68	-4.2643
21	0.000	363.150	.02356	7.529	332.00	328.93	• 93	-5.9427
21	0.000	368.150	•00598	6.644	293.00	286.54	2.25	-13.8779
34	0.000	227.594	•50023	13.284	585.80	585.04	.13	-1.1471
34	0.000	233.150	.48069	13.139	579.40	578.62	. 14	-1.1655
34	0.000	238.706	.46116	12.990	572.80	572.09	. 12	-1.1856
34	0.000	244.261	.44162	12.835	566.00	565.44	.10	-1.2075
34	0.000	249.817	•42209	12.681	559.20	558.67	• 10	-1.2315
34	0.000	255.372	•40255	12.522	552.20	551.76	.08	-1.2577
34	0.000	266.483	• 36348	12.209	538.40	537.46	. 18	-1.3180
34	0.000	277.150	•32597	11.883	524.00	523.04	-18	-1.3879
34	0.000	288.706	•28534	11.504	507.30	506.48	• 16	-1.4812
34	0.000	310.928	•20719	10.708	472.20	470.92	.27	-1.7418
34	0.000	322.039	• 16812	10.273	453.00	450.52	• 55	-1.9427
34	0.000	333.150	·12905	9.783	431.40	427.41	•93	-2.2373
36	0.000	273.150	•34004	12.033	530.60	528.53	• 39	-1.3601
36	0.000	278.150	•32246	11.878	523.80	521.65	•41	-1.3952
36	0.000	283.150	.30487	11.720	516.80	514.57	.43	-1.4337
36	0.000	290.150	•28026	11.482	506.30	504.33	•39	-1.4944
36	0.000	293.150	.26971	11.389	502.20	499.81	• 48	-1.5232
36	0.000	297.150	•25564	11.248	496.00	493.63	•48	-1.5647
36	0.000	300.150	•24509	11.153	491.80	488.89	•60	-1.5984
36	0.000	315.150	.19235	10.577	466.40	463.43	•64	-1.8103
36	0.000	321.150	.17125	10.091	445.00	452.23	-1.60	-1.9239
36	0.000	323.150	•16422	10.232	451.20	448.34	•64	-1.9670
36	0.000	327.150	.15015	10.046	443.00	440.29	· 62	-2.0627
36	0.000	329.150	.14312	9.958	439.10	436.11	•69	-2.1163

Number of data points used in fit = 120; rms density deviation = 0.074%.

Table 3. Comparisons of saturated vapor density data with eq (4).

	dp _V /dT kg/(m3•K)	.202E-07	.378E-05	.243E-04	.111E-03	.390E-03	0111E-02	• Z/UEUZ 571E02	109F-01	. 189E-01	.307E-01	.469E-01	.684E-01	.958E-01	.130E+00	.172E+00	.223E+00	.284E+00	.359E+00	.450E+00	.562E+00	.703E+00	.886E+00	.114E+01	. 586E +00	.485E+00	007E400	. 955F+00	.955E+00	.123E+01	.124E+01	.167E+01	.167E+01	.200E+01	.200E+01	2480+01	249E+01	. 330E+01	.498E+01	
	F(Z) 1	3.44173	2.43461	2.10712	1.85117	1.64705	1.4820/	1.04000	1.13950	1.06017	.99318	.93654	.88871	.84848	.81493	•78736	.76529	•74844	• 73679	.73066	. 73092	.73945	•76065	-80766	. /4585	. 72/68	17901	72157	.71136	.72432	.71828	.73787	.73196	.74430	.74249	.75993	70160	.77728	.81048	
Clegg,	Z(calc)	1.00000	1.00000	66666*	96666*	99985	15666	99890	99585	.99279	.98835	.98223	.97418	.96393	.95125	.93593	.91774	.89651	.87206	.84424	.81284	.77762	.73814	.69358	86554	.85462	117000	77484	.72471	.67846	.67826	.62459	.62417	.59339	. 59293	.55794	55/48	.51568	.46319	
(4)Sage, (6)Reamer, (7)Clegg	Z(expt)	1.00000	1.00000	66666*	96666	.99985	75666	998890	10/66	.99280	.98835	.98221	.97413	.96387	.95124	•93604	.91804	.89700	.87256	.84421	.81110	.77176	. 72319	.65735	86216	.854/4	7/0000	.72423	,72800	.67835	.68084	.62286	.62552	.59298	.59360	.55608	. 55/56	.51532	.46176	
(4)Sage, (6	Diff.	000	00.	00°	00.	00.	9	000	38	000	00°	00°	.01	.01	00°	01	03	05	90°-	00.	•21	•76	2.07	5.51	• 10	02	100	00,	45	•02	L. 38	.28	22	.07		.55	-0-1	0.07	.31	
oor pressure equations, (25)Thomas, (36)Dana.	Density (calc) kg/m3	.57076E-07	.16639E-04	.13030E-03	.71538E-03	.29807E-02	.998/6E-02	. 28103E-01 68650E-01	14941F+00	.29556E+00	.54018E+00	.92419E+00	.14961E+01	.23117E+01	.34347E+01	.49376E+01	.69037E+01	.94307E+01	,12636E+02	.16665E+02	.21704E+02	.27999E+02	.35898E+02	.45931E+02	. 15828E +02	.18155E+02	*2333/E+UZ	-30271E+02	.38795E+02	.49612E+02	.49661E+02	.63883E+02	•64000E+02	.72990E+02	.73130E+02	.84119E+02	.84268E+02	.98542E+02	.11846E+03	
Virial/vapor pressure Deschner, (25)Thomas,	ty (expt) kg/m3	.57076E-07	.16639E-04	.13030E-03	.71538E-03	.29808E-02	.998//E-02	.28102E-01	14941F+00	.29555E+00	.54018E+00	.92422E+00	.14961E+01	.23118E+01	.34348E+01	.49370E+01	.69014E+01	.94256E+01	.12629E+02	•1666E+02	.21750E+02	.28211E+02	.36640E+02	.48463E+02	• 15850E+0Z	.18150E+02	20320E+02	.38800F+02	.38620E+02	.49620E+02	.49473E+02	.64060E+02	•63862E+02	.73040E+02	.73047E+02	.84400E+02	.84257E+02	.99000E+02	.11883E+03	
(21)	Densi mol/L	0000	000	000	000°	000	000	00.	2000	.007	.012	.021	•034	.052	•078	.112	•157	.214	•286	.378	.493	.640	.831	1.099	.514	.412 EZE	0000	0000	.876	1,125	1.122	1.453	1.448	1.656	1.657	1.914	1.91 0.01	2.236	2.695	
ss and ID numbers on, (16)Sliwinski	Temp.	90.000	110.000	120,000	130.000	140.000	150.000	120 000	180,000	190.000	200,000	210,000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290,000	300.000	310,000	320,000	330.000	285.200	293.190	212 120	323, 120	323.150	333.110	333,150	343.080	343.150	348,080	348.150	555.090	553.150	358.150	63.11	
Data sources (12)Helgeson,	Weight	000	•002	•012	.040	.092	166	707.	43.1	.513	.586	•650	• 705	.753	• 793	.827	.857	.882	.903	.921	.937	00000	000 0	0.000	606°	.926	146.	90.4	965	.974	.974	.983	.983	986*	986	066*	990	266.	966°	
	01		-	-										-	-	-	-		_				-	·- '	9 ;	91	0 7	0 7	25	16	25	16	25	16	25	9 10	25	25	16	

1 See section 2.3(b) for definition of F(Z).

Table 3. (Continued).

	dpy/dT kg/(m3•K)	.500E+01 .644E+01	. 941E+01	.126E+02	219E+02	,229E+02	.450E+02	.491E+00	.576E+00	.664E+00	.857F+00	.960E+00	.108E+01	.120E+01	.134E+01	.150E+01	. 191E+01	.217E+01	.248E+01	.287E+01	417F+01	.536E+01	.776E+01	. 1/2E+UZ . 761F+OO	.987E+00	. 120E+01	.149E+01	.244E+01	.332E+01	.526E+01	.140E+02	.124E+01	.167E+01	.200E+01	.330F+01	. 500E +01
	F(Z)	.80894	.85558	87641	.91033	.90860	.94459	.83834	.82578	. /9695	75789	74597	.73183	.73918	•73772	• /59 /4 70 50 7	,75218	.76643	.78087	80766	82200	.83152	.83510	12968	.67210	.72929	.75632	.74778	.76750	.79250	.85284	.72251	.74184	.75125	.77869	.81100
Clegg,	Z(calc)	.46270	.42878	.38072	.35033	34834	.32475	.83234	.80918	. /8686	. 74398	.72375	.70330	.68347	.66327	.64296	06009	.57973	.55791	53572	48459	45494	.41797	. 76440	.71888	.68374	.64452	.56081	.51466	.45715	.37372	.67826	.62417	.59293	.51568	.46270
(6)Reamer, (7)Clegg	Z(expt)	.45557	.40199	.37995	.34761	.34843	.31862	80686	.78225	.76446	73031	.71379	.69898	.67658	.65801	.65830	59497	.56953	.54383	.51798	46674	.44322	•42285	. 28908	.73767	.68116	63165	.56533	.52075	.47049	.39454	.67897	.62047	. 58880	.51445	.46114
(4)Sage, (6	Diff. %	0.00	07.	•20	787	03	1.92	3, 16	3.44	2.93	12.87	1.40	• 62	1.02	089	.73	1,00	1.79	2.59	3.42	20,00	2.64	-1.16	-0-89	-2.55	. 38	2.04	-80	-1.17	-2.84	-5.28	10	09°	• 70	24	.34
or pressure equations, (25)Thomas, (36)Dana.	Density (calc) kg/m ³	.11866E+03 .12997E+03	.1529/E+05 .14538E+03	.15565E+03	171816+03	-	.18681E+03	.18512E+02	.22326E+02	.26279E+02	.30420E+02 .34673F+02	.39007E+02	.43641E+02	•48375E+02	. 534 50E+02	.58812E+02	.70741E+02	.77177E+02	.84129E+02	.91538E+02	11005F+03	.12182E+03	.13780E+03	. 1052/E+U5 . 30544F+02	.40087E+02	.48310E+02	.58390E+02	.83184E+02	.98906E+02	.12092E+03	.15923E+03	.49661E+02	.54000E+02	.73130E+02	.84268E+UZ .98542F+U2	.11866E+03
Virial/vap Deschner,	ty (expt) kg/m3	.11871E+03	.15524E+U5 .14526E+O3	.15596E+03	. 17315F±03	.17288E+03	.19040E+03	.19097E+02	.23095E+02	.27049E+02	.31092E+02	.39552E+02	.43910E+02	.48869E+02	•53878E+02	.59240E+02	.71446E+02	.78559E+02	.86307E+02	.94672E+02	11426F+03	.12505E+03	.13621E+03	.15588E+U5 .30672F+02	.39066E+02	.48494E+02	.59580E+02	.82519E+02	.97750E+02	.11749E+03	.15083E+03	.49609E+02	.64382E+02	.73642E+02	.8466/E+02 .98778F+02	.11906E+03
numbers: (1) iwinski, (21)	Densi mol/L	2.692	5.022 3.294	5.537	7.927	3.920	4.318	.433	.524	.613	207	∞	966*	1.108	1.222	1.543	1.620	1.782	1.957	2.147	2.591	2,836	3.089	0.490	.886	1.100	1.551	1.871	2.217	2.664	5.420	1,125	1.460	1.670	7.240	2.700
and 1D , (16)SI	Temp. K	363.150	367.150	368.100	369-100	369.150	369.600	3.92	0	7.48	318,594	3.37	.92	0	0	539.872	346.928	350.094	353.094	355.872	361.261	363.761	366.261	313,480	324.480	0	339.590				368.370			48°1	358.150	63.1
Data sources (12)Helgeson	Weight	966.	8666	666.		1.000			0.000	00000	000					0000	0 0	00000		0000	00000	000 0	0000	0000	00000	00000	0000	000000		00000	00000	0 0			0000	00000
	0	25	25	16	16	25	16	4	4	4 .	4 4	4	4	4	4	4 4	1 4	4	4	4 4	1 4	4	4	4 C	9	9	ی ص	9	9	91	9 ~	7	7	_ 1		7

Table 3. (Continued).

	dp/dT kg/(m3•K)	.128E+02	.340E+00	*386E+00	.437E+00	.495E+00	• 560E+00	.633E+00	.718E+00	.815E+00	. 930E+00	•107E+01	.124E+01	.145E+01	• 173E+01	.214E+01	.279E+01	.405E+01	.603E+00	.674E+00	.755E+00	.848E+00	.955E+00	. 108E+01	.124E+01	.142E+01	. 167E+01	.200E+01	.249E+01	.330E+01	.500E+01	.128E+02	.451E+00	.483E+00	.721E+00	.910E+00	.955E+00
	F(Z)	.87288	.72375	.72134	.71988	.71951	•71896	.71904	•71916	.71931	•71954	•72068	*72196	.72496	• 72906	.73601	.74775	.77176	.20439	.50584	.61494	.70117	.75377	.79273	.79274	.76858	.76250	.73431	.74468	.77215	.80475	.88237	.74621	.74168	.69284	•69083	.67517
Clegg	Z(calc)	.37947	.87825	.86367	.84803	.83131	.81345	.79442	.77415	.75255	.72951	.70484	•67826	.64937	.61752	.58166	.53988	.48817	.80217	.78444	.76567	.74580	.72471	.70227	.67826	.65238	.62417	.59293	.55748	.51568	.46270	.37947	.84379	.83474	.77331	.73330	.72471
(4)Sage, (6)Reamer, (7)Clegg	Z(expt)	.38206	.88130	.86647	.85046	.83316	.81482	.79522	•77449	.75262	,72960	.70505	.67921	.65127	.62131	.58813	• 55008	.50144	. 94405	.84876	.79982	.75227	.71178	•67284	•64776	.63317	06609°	.59808	.56465	.51852	°46529	.37534	.84042	.83170	.78192	.74398	.74184
(4)Sage, (6	Diff.	68	35	32	29	22	17	10	04	01	01	03	14	29	61	-1.10	-1.86	-2.65	-15.03	-7.58	-4.27	86	1.82	4.37	4.71	3.03	2.34	86	-1.27	55	56	1.10	.40	.37	-1.10	-1.44	-2.31
ressure equations, Thomas, (36)Dana.	Density (calc) kg/m ³	.15628E+03	•11796E+02	.13809E+02	• 16092E+02	.18676E+02	.21601E+02	.24910E+02	.28658E+02	*32909E+02	.37748E+02	.43283E+02	.49661E+02	.57092E+02	•65890E+02	.76580E+02	.90122E+02	.10868E+03	.23537E+02	.26725E+02	.30294E+02	.34295E+02	.38795E+02	.43880E+02	.49661E+02	.56293E+02	•64000E+02	.73130E+02	.84268E+02	.98542E+02	.11866E+03	.15628E+03	.16733E+02	.18133E+02	.28818E+02	.36930E+02	.38795E+02
<pre>)Virfal/vapor pressure)Deschner, (25)Thomas,</pre>	ity (expt) kg/m³	.15522E+03	•11755E+02	.13764E+02	.16046E+02	.18635E+02	.21565E+02	.24885E+02	.28645E+02	.32906E+02	.37744E+02	.43270E+02	.49592E+02	.56925E+02	•65489E+02	.75737E+02	.88450E+02	.10580E+03	.20000E+02	.24700E+02	.29000E+02	.34000E+02	.39500E+02	.45799E+02	.51999E+02	.58001E+02	.65498E+02	.72500E+02	.83198E+02	.98002E+02	.11800E+03	•15800E+03	• 16800E+02	.18200E+02	.28500E+02	*36400E+02	.37900E+02
(21	Densi mol/L	3.520	•267	.312	.364	.423	•489	• 564	•650	.746	.856	.981	1.125	1,291	1.485	1.718	2.006	2,399	• 454	• 560	.658	.771	968°	1.039	1.179	1.315	1.485	1.644	1.887	2,222	2.676	3,583	.381	.413	• 646	.825	.859
Data sources and ID numbers: (1)(12)Helgeson, (16)Sliwinski, (21	Temp. K	368.150	277.594	283.150	288.706	294.261	299.817	305.372	310,928	316.483	322.039	327 • 594	333.150	338.706	344.261	349.817	355.372	360.928	303.150	308.150	313,150	318,150	323.150	328.150	333.150	338.150	343.150	348.150	353.150	358,150	363.150	368.150	290.150	293.150	311,150		323.150
Data source (12)Helgesc	Weight	00000	000*0	000°0	000°0	000°0	000*0	000°0	00000	000*0	00000	00000	00000	00000	00000	000°0	000*0	000°0	000°0	00000	00000	00000	000.0	00000	00000	000°0	00000	00000	000°0	00000	00000	00000	00000	000°0	000*0	00000	000°0
	Ol	7	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	21	21	21	21	21	21	21	21	21	21	21	21	21	21	36	36	36	36	36

Number of data points used in fit = 46; rms density deviation = 0.19%.

Table 4. Comparisons of virial coefficients with eq (5).

Second virial coefficients of propane

Data sources and ID numbers: (1)McGlashan, (2)Kapallo, (3)Dymond/Smith; (4)Strein, (5)Hahn (7)Gunn, (8)Brewer, (9)Beattie, (10)Bottomley, (11)Cherney, (12)Deschner, (13)Jessen, (14)Kretschmer, (15)Reamer, (16)Sage.

ID	Weight	Temp. K	T/T _c	B cm3/mol	B _r (expt)	B _r (calc)	Diff.	Diff.
5	.146	211.300	•5713	-844.00	-4.2200	-4.1843	0357	85
5	•464	231.200	.6251	-680.00	-3.4000	-3.4051	•0051	•15
2	.095	244.000	.6597	-610.00	-3.0500	-3.0159	0341	-1.13
8	.418	248.150	.6709	-579.00	-2.8950	-2.9043	•0093	•32
5	.332	251.500	.6800	-567.00	-2.8350	-2.8188	0162	58
3	.470	260.000	.7030	-526.00	-2.6300	-2.6184	0116	44
3	•209	270.000	.7300	-478.00	-2.3900	-2.4093	•0193	.80
2	.082	273.000	.7381	-477.00	-2.3850	-2.3516	0334	-1-42
8	•574	273.150	.7385	-468.00	-2.3400	-2.3488	•0088	•37
13	.976	273.160	.7386	-470.00	-2.3500	-2.3486	0014	
5	•224	273.800	.7403	-471.00	-2.3550	-2.3366	0184	06 79
3		285.000						
	•206		•7706	-424.00	-2.1200	-2.1406	•0206	.96
16	•012	294.270	.7956	-4 17.56	-2.0878	-1.9966	0912	-4.57
10	.029	295.210	.7982	-407.90	-2.0395	-1.9828	0567	-2.86
1	.274	295.400	.7987	399.00	-1.9950	-1.9801	0149	75
4	.434	296.100	.8006	-396.00	-1.9800	-1.9699	0101	51
2	•326	297.000	.8030	-394.00	-1.9700	-1.9570	0130	66
8	.995	298 - 150	-8061	-388.00	-1.9400	-1.9407	•0007	-04
3	.359	300.000	.8111	-380.00	-1.9000	-1.9149	.0149	.78
12	• 059	303.160	.8197	-382.04	-1.9102	-1.8719	0383	-2.05
12	.039	303.160	. 8197	-384.00	-1.9200	-1.8719	0481	-2.57
14	.009	303.160	.8197	-395.00	-1.9750	-1.8719	1031	-5.51
1	•225	306.500	.8287	-369.00	-1.8450	-1.8281	0169	93
4	.818	308.000	.8328	-360.50	-1.8025	-1.8089	•0064	•35
7	•012	310.900	.8406	-335.80	1.6790	-1.7727	•0937	5.28
15	.011	310.940	.8407	-335.49	-1.6775	-1.7722	•0947	5.34
15	•007	310.940	.8407	-330.00	-1.6500	-1.7722	-1222	6.89
16	.005	310.940	.8407	-381.80	-1.9090	-1.7722	1368	-7.72
3	.270	315.000	.8517	-341.00	-1.7050	-1.7232	.0182	1.06
1	.870	317.600	.8587	-339.00	-1.6950	-1.6930	0020	12
2	•043	321.000	.8679	-340.00	1.7000	-1.6546	0454	-2.75
11	.214	323.160	•8738	-329.62	-1.6481	-1.6308	0173	-1.06
13	•866	323.160	.8738	-325.00	-1.6250	-1.6308	•0058	•36
1	.064	327.600	.8858	-324.00	-1.6200	-1.5836	0364	-2.30
15	.033	327.600	. 8858	-305.44	-1.5272	-1.5836	.0564	3.56
15	• 036	327.600	•88 <i>5</i> 8	-306.00	-1.5300	-1.5836	.0536	3.39
16	•003	327.600	.8858	-353.45	-1.7673	-1.5836	1836	-11.60
3	.671	330.000	.8923	-310.00	-1.5500	-1.5589	•0089	. 57
4	•255	332.900	.9001	-309.00	-1.5450	-1.5298	0152	99
1	.325	337.800	.9133	-299.00	-1.4950	-1.4825	0125	84
15	•191	344.270	•9308	-280.15	-1.4008	-1.4232	.0224	1.58
15	• 230	344.270	•9308	-280.60	-1.4030	-1.4232	•0202	1.42
16	.004	344.270	•9308	-316.71	-1.5836	-1.4232	1604	-11.27
7	•216	344.300	• 9309	-280.40	-1.4020	-1.4229	•0209	1.47
1	•207	347.900	•9407	-274.00	-1.3700	-1.3914	.0214	1.54
12	•029	348.160	. 94 14	-289.13	-1.4457	-1.3892	0564	-4.06
12	•016	348.160	.9414	-293.00	-1.4650	-1.3892	0758	-5.46
3	.901	350.000	. 9463	-275.00	-1.3750	-1.3735	0015	±•11
4	•285	353.800	•9566	-271.20	-1.3560	-1.3420	0140	-1.05
1	.242	357.900	•9677	-265.00 /	-1.3250	-1.3091	0159	-1.22
15	•897	360.940	•9759	-256.06	-1.2803	-1.2854	•0051	.40
15	•999	360.940	•9759	-256.80	-1.2840	-1.2854	•0014	• 11
16	•005	360.940	•9759	-283.74	1.4187	-1.2854	1333	-10.37
1	.513	368.200	• 9955	-244.00	-1.2200	-1.2314	.0114	•92
9	•461	369.970	1.0003	-245.58	-1.2279	-1.2187	0092	76
9	•014	369.970	1.0003	-260.00	-1.3000	-1.2187	0813	-6.67
9	.326	373.160	1.0089	-241.82	-1.2091	-1.1963	0128	-1.07
9	.058	373.160	1.0089	-247.00	-1.2350	-1.1963	0387	-3.24
11	•734	373.160	1.0089	-240.15	-1.2008	-1.1963	0045	 37
12	•075	373.160	1.0089	-245.98	-1.2299	-1.1963	0336	-2.81
12	•014	373.160	1.0089	-256.00	-1.2800	-1.1963	0837	-7.00
4	• 248	373.400	1.0096	-242.10	-1.2105	-1.1946	0159	-1.33

Table 4. (Continued).

Second virial coefficients of propane

Data sources and ID numbers: (1)McGlashan, (2)Kapallo, (3)Dymond/Smith, (4)Strein, (5)Hahn, (7)Gunn, (8)Brewer, (9)Beattie, (10)Bottomley, (11)Cherney, (12)Deschner, (13)Jessen, (14)Kretschmer, (15)Reamer, (16)Sage.

ID	Weight	Temp. K	T/T _C	B cm ³ /mol	B _r (expt)	B _r (calc)	Diff.	Diff.
3 7	.923 .310	375.000 377.600	1.0139 1.0210	-237.00 -235.90	-1.1850 -1.1795	-1.1836 -1.1661	0014 0134	12 -1. 15
15	•492	377.600	1.0210	-234.95	-1.1748	-1.1661	0087	74
15	• 586	377.600	1.0210	-234.60	-1.1730	-1.1661	0069	59
16	•008	377.600	1.0210	-254.72	-1.2736	-1.1661	1075	-9.22
1 .	•218 •266	377.700 - 380.960	1.0212 1.0300	-229.00 -225.18	-1.1450 -1.1259	-1.1654 -1.1439	.0204 .0180	1.75 1.57
1	.100	388.500	1.0504	-213.00	-1.0650	-1.0963	•0313	2.85
4	.709	394.000	1.0653	-213.70	-1.0685	-1.0633	0052	49
9	908	398 • 160	1.0765	-208.26	-1.0413	-1.0392	0021	20
9	•260	398.160	1.0765	-211.00	-1.0550	-1.0392	0158	-1.52
11	• 959	398.160	1.0765	-207.21	-1.0361	-1.0392	.0031	•30
12	•460	398.160	1.0765	-209.79	-1.0490	-1.0392	0098	94
12	•015	398.160	1.0765	-224 • 00	-1.1200	-1.0392	0808	-7.78
3	•952	400.000	1.0815	-206.00	-1.0300	-1.0288	0012	12
1 =	. 169	400.100	1.0818	-201.00	-1.0050	-1.0282	•0232	2.26
15 15	•125 •106	410.940 410.940	1.1111	-199.07 -199.60	9954 9980	9697 9697	0256 0283	-2.64 -2.92
4	•987	413.800	1.1188	-191.10	 9555	9551	0004	-2.9 2
9	•987	423.160	1.1441	-181.48	9074	9090	•0016	. 18
9	.706	423.160	1.1441	-183.00	9150	9090	0060	65
12	.111	423.160	1.1441	-187.36	9368	9090	0278	-3.05
12	.017	423.160	1.1441	-197.00	9850	9090	0760	-8.36
3	.914	430.000	1.1626	-176.00	8800	8773	0027	31
4	1.000	433.100	1.1710	-172.60	8630	8633	.0003	.04
15	. 147	444.270	1.2012	-167.93	8397	8155	0241	-2.96
15	. 125	444.270	1.2012	-168.40	8420	8155	0265	-3.25
7	•207	444.300	1.2013	-167.00	8350	8154	0196	-2.41
9	•903 •999	448.160 448.160	1.2117 1.2117	-159.30 -160.00	7965 8000	7996 7996	-0031 0004	04
4	• 953	453.500	1.2262	-156.20	7810	7785	0004	32
3	•909	470.000	1.2708	-143.00	7150	 7175	.0025	•35
9	•669	473.160	1.2793	-140.04	7002	7065	•0063	.89
9	•400	473.160	1.2793	-139.00	6950	7065	.0115	1.62
12	. 100	473.160	1.2793	-147.44	7372	7065	0307	-4.35
12	•021	473.160	1.2793	-155.00	7750	7065	0685	-9.70
4	•983	474.900	1.2840	-140.00	7000	7005	•0005	.07
15	.315	477.600	1.2913	141.40	7070	6914	0156	-2.26
15 4	•241 •971	477.600	1.2913 1.3338	-142.00	7100	6914 6410	0186 .0005	-2.70
9	•297	493.300 498.160	1.3336	-128.10 -122.45	6405 6123	6262	•0140	.07 2.23
9	•163	498.160	1.3469	-121.00	6050	6262	.0212	3.39
3	•658	500.000	1.3519	-123.00	6150	6208	•0058	.93
7	•787	510.900	1.3814	-117.20	5860	5895	.0035	•59
15	1.000	510.940	1.3815	-118.19	5910	5894	0016	27
15	-868	510.940	1.3815	-119.00	5950	5894	0056	95
9	•471	523.160	1.4145	-109.57	5479	5564	.0086	1.54
9	•356	523.160	1.4145	-109.00	5450	5564	.0114	2.05
12	• 902	526.380	1.4232	-110.70	5535	5481	0054	99
12 9	•490 •498	526.380 548 160	1.4232 1.4821	-108.00 -07.55	5400 - 4979	5481 4952	.0081 .0074	1.48 1.50
9	• 498	548 • 160 548 • 160	1.4821	-97.55 -96.00	4878 4800	4952 4952	•0152	3.06
3	•574	550.000	1.4871	-97.00	4850	 4910	•0060	1.21
12	.511	570.460	1.5424	-91.89	 4595	4465	0129	-2.90
12	.821	570.460	1.5424	-89.00	4450	4465	.0015	•34
12	.040	609.320	1.6475	-85.19	4260	3728	0532	-14.26

Number of data points = 118; rms deviation = 1.20%.

Table 4. (Continued).

Third virial coefficients of propane

Data sources and ID numbers: (1)McGlashan, (2)Kapallo, (3)Dymond/Smith, (4)Strein, (5)Hahn, (7)Gunn, (8)Brewer, (9)Beattie, (10)Bottomley, (11)Cherney, (12)Deschner, (13)Jessen, (14)Kretschmer, (15)Reamer, (16)Sage.

ID	Weight	Temp.	T/T _C	C (cm ³ /mol) ²	C _r (expt)	C _r (calc)	Diff.
16	.002	294.270	•7956	-10510.	2628	-2.4978	2.2350
12	•163	303.160	-8197	-62760.	-1.5690	-1.7060	•1370
15	• 469	310.940	. 8407	-54120.	-1.3530	-1.1762	1768
15	•065	310.940	.8407	-65000.	-1.6250	-1.1762	4488
16	• 006	310.940	.8407	861.	.0215	-1.1762	1.1977
11	.755	323.160	.8738	-22470.	5618	5711	•0094
15	.329	327.600	•8858	-23530.	5883	4044	1838
15	•523	327.600	.8858	-14000.	3500	4044	•0544
16	•003	327.600	.8858	59710.	1.4928	4044	1.8972
15	•722	344.270	.9308	-1725.	0431	.0416	0848
15	.912	344.270	•9308	2000.	.0500	•0416	•0084
16	.009	344.270	•9308	42550.	1.0638	.0416	1.0221
12	.023	348.160	. 9414	29980.	.7495	•1141	•6354
15	•523	360.940	.9759	7413.	.1853	•2921	1068
15	.837	360.940	.9759	13000.	•3250	•2921	•0329
16	•052	360.940	.9759	28280.	.7070	•2921	.4149
9	. 417	369.970	1.0003	19450.	• 4863	•3751	.1112
9	.997	373.160	1.0089	15890.	•3973	.3978	0006
11	•576	373.160	1.0089	19120.	.4780	•3978	•0802
12	•556	373.160	1.0089	19260.	.4815	•3978	.0837
15	• 453	377.600	1.0210	12430.	. 3108	•4247	1140
15	•207	377.600	1.0210	9000.	•2250	•4247	1997
16	.751	377.600	1.0210	14520.	•3630	•4247	0617
12	•967	380.960	1.0300	18290.	•4573	•4417	•0155
9	•469	398.160	1.0765	15550.	• 3888	•4940	1053
11	•658	398.160	1.0765	16920.	•4230	• 4940	0710
12	•696	398.160	1.0765	17160.	•4290	• 4940	0650
15	•992	410.940	1.1111	20000.	•5000	•5060	0060
15	• 426	410.940	1.1111	25000.	•6250	•5060	•1190
9	.357	423.160	1.1441	14960.	•3740	•5039	1299
12	•563	423.160	1.1441	16800.	•4200	•5039	0839
15	•995	444.270	1.2012	19190.	•4798	•4817	0020
15	•564	444.270	1.2012	23000.	•5750	• 4817	•0933
9	•425	448.160	1.2117	14610.	•3653	•4760	1108
9	•607	473.160	1.2793	14370.	•3593	•4339	0747
12	•774	473.160	1.2793	15430.	•3858	•4339	0482
15	•957	477.600	1.2913	18120.	•4530	•4259	•0271
15	• 535	477.600	1.2913	21000.	•5250	•4259	•0991
9	•689	498.160	1.3469	13090.	•3273	•3887	0615
15	.877	510.940	1.3815	16365.	•4091	•3662	.0429
15	.195	510.940	1.3815	23000.	•5750	•3662	•2088
9	.910	523.160	1.4145	12780.	•3195	•3456	0261
12	1.000	526.380	1.4232	13840.	•3460	•3403	•0057
9	• 998	548.160	1.4821	12630.	•3158	•3065	•0092
12	•900	570.460	1.5424	12540.	.3135	• 2757	•0378
12	1.000	609.320	1.6475	9373.	•2343	•2305	•0038

Number of data points = 46.

Table 5. Behavior of coefficients of equation of state for propane (eq (6)).

ρ/ρ _C	Τ _σ Κ	⊖ K	Po MPa	В(р)	C(p)
.10 .20 .30 .40 .50 .60 .70	300 •609 328 • 350 344 • 408 354 • 668 361 • 308 365 • 501 367 • 994 369 • 291	283.690 315.259 335.148 348.633 357.737 363.647 367.205 369.056	1.0133 1.9147 2.6487 3.2178 5.555 5.9237 4.1048 4.2035	.45809 .46283 .47075 .48182 .49606 .51347 .53404	46999 39609 32679 26259 20390 15101 10413 06335
.90 1.00 1.10 1.20 1.30 1.40 1.50	369.780 369.850 369.774 369.305 368.143 366.050 362.843	369.750 369.850 369.745 369.071 367.354 364.193 359.257	4.2418 4.247 4.2414 4.2046 4.1160 3.9624 3.7385	•58467 •61473 •64796 •68435 •72391 •76663 •81251	02867 0.00000 .02285 .04013 .05219 .05939 .06220
1.60 1.70 1.80 1.90 2.00 2.10 2.20	358.390 352.604 345.429 336.837 326.818 315.374 302.518	352.291 343.123 331.657 317.879 301.853 283.721 263.703	3.4467 3.0963 2.7015 2.2806 1.8536 1.4411 1.0625	.86157 .91378 .96916 1.02770 1.08941 1.15428 1.22232	.06107 .05650 .04902 .03913 .02734 .01414
2.30 2.40 2.50 2.60 2.70 2.80 2.90	288 • 274 272 • 683 255 • 802 237 • 713 218 • 534 198 • 415 177 • 545	242.095 219.261 195.627 171.671 147.900 124.827 102.943	.7342 .4677 .2686 .1346 .0562 .0183	1.29352 1.36789 1.44542 1.52612 1.60998 1.69700 1.78719	01464 02939 04389 05782 07092 08298 09381
3.00 3.10 3.20 3.30 3.40	177-345 156-139 134-434 112-662 91-042 69-762	82.685 64.403 48.340 34.622 23.256	.0042 .0006 .0000 .0000 .0000	1.88054 1.97706 2.07674 2.17959 2.28560	10330 11135 11793 12302 12665

Table 6. Calculated P(ρ) critical isotherm of propane. (At the critical point dPg/dT = (3P/3T) ρ_c = 0.081126 MPa/K.)

	Lo		
	(34/30r,+)Tc	.11237 .10257 .09332 .08433 .05747 .05747 .05220 .05220 .05220 .05220 .05220 .00364 .01292 .00360 .00360 .00036 .00036 .00036 .00134 .00134 .00134 .00136 .00134 .00136 .0	
	(3\$/30r,+)T _C	02929 02542 02542 0192113 01936 000088 000088 00035 	
	(dP _G /dρr,t)T _C MPa		
0.081126 MPa/K.)	(d0/dpr,+)Tc K	9.92968 8.03833 7.16766 6.34720 5.57709 4.85739 4.85739 4.85739 6.34720 2.48214 2.01361 1.59477 1.22532 6.02225 6.02225 1.39046 1.1204 1.39046 1.39090	
$= (3P/3T)\rho_{\rm C} = 0.081126$	(dT _G /dpr,+)T _C	6.99852 6.31352 5.66379 5.04951 4.47084 3.92787 2.94927 2.91351 1.12558 1.74905 1.41981 1.12558 1.64992 2.8609 2.64098 3.6409 3.64098	
dPo/dT	(3P/30r,+)T MPa	.058081401 .049329294 .041523062 .034606876 .023219823 .018636195 .014717385 .014717385 .014717385 .014717385 .016506122 .00650819 .00650819 .000349184 .000349184 .00003468 .00003468 .00003468 .00003468 .00003468 .00003468 .000029613 .000289119 .005289119 .005489701 .00784887 .010822515 .010822515 .010822515 .0108229613 .005480701 .00784887 .005480701 .00784887	
point	P/P _C	9999017403 9999207195 9999367700 99997613651 9999778865 99999837701 99999837701 99999837701 99999837701 99999983761 99999983761 99999983761 99999983761 99999983761 999999987597 99999999674 99999999674 99999999674 99999999674 99999999674 999999999999999999999999999999999999	
	Pg/Pc	9986782277 9988657609 9990346639 99903264124 9994391955 9995432208 99996534720 9999126712 9999126712 999997766004 99999776552 9999985011 1,0000000000 9999985011 1,0000000000 9999985011 1,000000000000000000000000000000000	
	T_{σ}/T_{c}	9998102835 99988373258 9998837160 999981616553 9999198087 99999198087 9999916097 99999875737 999999875737 999999875737 999999875737 999999875737 999999875737 999999875737 999999875737 999999875737 9999997984669 999997984269 999997984269 99999798429	
	p/pc	0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0	

Table 7. Comparisons of experimental P- ρ -T data of propane with eq (6).

Summary of P-P-T data comparisons.

		Range of Data		No. of	Devia	itions
Authors	T(K)	P(MPa)	ρ(kg/m ³)	Points	Δρ/ρ,rms (%)	ΔP/P,mean (%)
Beattie [2] Deschner [22] Cherney [14] Reamer [73] Dawson [21] Dittmar [23] Tomlinson [98] Ely [25] Teichmann [94] Warowny [102] Haynes [42] Thomas [95] isochores isotherms	369-548 303-609 323-398 311-511 243-348 273-413 278-328 166-324 323-573 373-423 90-300 370-623 258-370	2.4 - 31.0 0.1 - 14.2 1.1 - 5.0 0.1 - 69.0 0.05- 0.18 1.0 -103.5 1.06- 13.8 0.26- 42.8 2.77- 60.9 0.3 - 6.4 0.6 - 37.5 2.0 - 40.0 0.6 - 35.7	44-441 1-418 17-114 1-576 1-3 320-590 452-530 508-651 108-461 5-170 493-741 35-486 35-549	106 236 25 306 18 325 40 222 148 51 196	0.46 1.28 0.27 0.32 0.20 0.21 0.11 0.06 0.69 0.83 0.07	0.36 0.92 0.17 0.62 0.18 1.41 4.61 4.62 6.83 0.24 8.27
Virial equation (this report)	270-600	0.4 - 1.0	8.8	34	0.20	0.10

Total number of points used in fit = 1946 Overall rms density deviation = 0.76% Overall mean pressure deviation = 2.41%

Table 7. (Continued)

ID	Data Point	Weight	Temp.	Dens exp		Density calc,	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mol/L	kg/m ³	kg/m ³	8	MPa	MPa	8
1	1	.100	270.000	• 200	8 • 82	8.82	05	•4057	•4055	•04
1	2	-100	280.000	•200	8.82	8.82	06	•4242	•4240	•05
1	3	.100	290.000	•200	8.82	8.83	08	•4425	•4422	•08
1	4	-100	300.000	•200	8.82	8.83	11	•4607	•4602	-10
1	5	•100 .	310.000	•200	8.82	8.83	14	•4787	•4781	•13
1	6	-100	320.000	•200	8.82	8.83	17	•4967	•4959	•16
1	7	.100	330.000	•200	8.82	8.84	19	•5145	•5136	•18
1	8	-100	340.000	•200	8.82	8.84	21	•5323	•5313	•20
1	9	·100	350.000	.200	8.82	8.84	22	•5500	•5489	•21
1	10	-100	360.000	•200	8.82	8.84	24	•5677	•5664	•22
1	11	-100	370.000	•200	8.82	8.84	24	•5853	•5839	•23
1	12	.100	380.000	.200	8.82	8.84	25	•6028	•6014	•24
1	13	•100	390.000	.200	8.82	8 • 84	25	•6203	•6188	•24
1	14	.100	400.000	.200	8.82	8.84	26	•6378	•6362	•25
1	15	•100	410.000	.200	8.82	8.84	26	•6552	•6536	• 25
1	16	-100	420.000	.200	8.82	8.84	25	•6726	.6710	•24
1	17	•100	430.000	.200	8.82	8.84	25	•6900	•6883	•24
1	18	•100	440.000	•200	8.82	8.84	25	•7073	•7056	•24
1	19	.100	450.000	•200	8.82	8.84	24	• 7246	.7229	•23
1	20	•100	460.000	.200	8.82	8.84	23	•7419	•7402	•23
1	21	.100	470.000	•200	8.82	8.84	23	• 7591	• 75 74	• 22
1	22	• 100	480.000	•200	8.82	8.84	22	•7764	.7747	•22
1	23	-100	490.000	.200	8.82	8.84	21	•7936	•7919	• 21
1	24	•100	500.000	•200	8.82	8 84	21	•8108	•8092	•20
1	25	-100	510.000	.200	8.82	8.84	20	•8280	•8264	•19
1	26	•100	520.000	•200	8.82	8.84	19	•8452	•8436	•19
1	27	•100	530.000	.200	8.82	8.84	18	•8623	.8608	•18
1	28	•100	540.000	•200	8.82	8.83	17	•8795	•8780	•17
1	29	•100	550.000	.200	8.82	8.83	17	•8966	•8952	•16
1	30	•100	560.000	•200	8.82	8.83	16	•9138	•9124	•15
1	31	•100	570.000	•200	8 • 82	8.83	15	•9309	•9295	•15
1	32	•100	580.000	•200	8.82	8.83	14	•9480	•9467	•14
1	33	.100	590.000	• 200	8.82	8.83	13	•9651	• 9638	•13
1	34	•100	600.000	•200	8.82	8.83	12	•9822	•9810	•12

Table 7. (Continued)

ID	Data Point	Weight	Temp.	Dens exp	t [′]	Density calc,	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mo1/L	kg/m ³	kg/m ³	%	MPa	MPa	Z
2	35	1.000	243.150	.045	1.99	1.99	11	.0887	.0886	.10
2	36	1.000	243.150	•060	2.63	2.63	02	•1161	•1160	•02
2	37	1.000	258.150	.060	2.62	2.63	09	.1237	.1236	•09
2	38	1.000	258.150	.045	1.99	1.99	11	•0945	.0944	•11
2	39	1.000	273.150	•071	3.12	3.12	16	•1552	•1550	•15
2	40	1.000	273.150	•045	1.99	1.99	19	•1003	. 1001	•19
2	41	1.000	273.150	•060	2.63	2.63	14	.1316	.1314	.14
2	42	1.000	288.150	•059	2.62	2.62	16	•1386	•1383	.16
2	43	1.000	288.150	.021	•91	•91	26	•0490	•0489	•26
2	44	1.000	288.150	•045	1.99	1.99	18	•1060	•1058	•18
2	45	1.000	288.150	.071	3.12	3.12	19	•1643	.1640	•19
2	46	1.000	288.150	•037	1.63	1.64	28	.0874	.0872	•27
2	47	1.000	323.150	•037	1.63	1.64	22	.0983	•0981	•22
2	48	1.000	323.150	•070	3.09	3.10	25	.1838	•1834	•24
2	49	1.000	323.150	• 021	• 91	• 91	12	•0551	•0551	•12
2	50	1.000	323.150	•045	1.99	1.99	25	•1193	.1190	. 25
2	51	1.000	348.150	•060	2.62	2.63	27	•1694	.1690	•27
2	52	1.000	348.150	•045	1.99	2.00	34	.1290	.1286	.34

Table 7. (Continued)

ID	Data Point No:	Weight	Temp• ·	Dens exp mo1/L	,	Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
13313313331333313333313333333333333333	No • 53 54 55 56 57 58 59 60 61 62 63 64 65 66 71 72 73 74	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	323.150 323.150 323.150 323.150 323.150 323.150 323.150 323.150 323.150 373.150 373.150 373.150 373.150 373.150 373.150 373.150 373.150 373.150 373.150 373.150	.474 .494 .533 .559 .577 .608 .631 .695 .773 .872 .383 .406 .462 .534 .634 .781 1.014 1.447 2.520 .535 .636 .784	20.88 21.79 23.48 24.63 25.46 26.82 27.81 30.63 34.10 38.44 16.90 17.92 20.36 23.57 27.98 34.42 44.71 63.79 111.11 23.61 23.61 23.61 23.61 23.61 23.61	20.91 21.82 23.54 24.65 25.53 26.88 27.88 30.74 34.21 38.66 16.95 17.97 20.41 23.60 28.02 34.45 44.67 63.58 110.91 23.67 28.10	*	MPa 1.0801 1.1186 1.1896 1.2341 1.2686 1.3203 1.3578 1.4601 1.5756 1.7094 1.0832 1.1419 1.2797 1.4540 1.6840 1.9971 2.4429 3.1127 4.0733 1.5847 1.8431 2.2018	MPa 1.0788 1.1171 1.1872 1.2334 1.2660 1.3181 1.3552 1.4565 1.5719 1.7031 1.0805 1.1390 1.2769 1.4521 1.6819 1.9956 2.4446 3.1192 4.0757 1.5813 1.8407 2.2007	% .13 .13 .20 .06 .20 .16 .19 .25 .23 .37 .24 .26 .22 .13 .13 .08072106 .22 .13 .13
13 13 13	75 76 77	1.000 1.000	398.150 398.150 398.150	1.021 1.464 2.580	45.04 64.57 113.79	44.98 64.25 113.26	•13 •50 •47	2.7267 3.5565 4.9781	2.7295 3.5688 4.9893	11 34 22

Table 7. (Continued)

1D	Data Point	Weight	Temp.	Dens exp	+	Density calc	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mo1/L	kg/m ³	kg/m ³	%	MPa	:/Pa	7,
3	78 79	1.000	369.960 373.150	•999 •999	44.06 44.06	43.62 43.83	1 • 02 • 53	2.3659 2.4085	2.3838 2.4181	75 40
3	80 81	1.000	398.150 423.150	•999 •999	44.06 44.06	43.95 43.97	• 26 • 22	2.6770 2.9354	2.6826 2.9408	21 18
3	82	1.000	448.150	. 999	44.06	43.97	•21	3.1887	3.1945	18
3	83	1.000	473.150	•999	44.06	43.99	•16	3.4400	3.4448	14
3	84	1.000	498.150 523.150	•999	44.06 44.06	44.02 43.94	•10	3.6892	3.6927	09
3	85 86	1.000	548.150	•999 •999	44.06	43.94	•28 •13	3.9284 4.1776	3. 9385 4. 1826	26 12
3	87	1.000	369.960	1.499	66.09	65.33	1.17	3.1087	3.1302	69
3	88	1.000	373.150	1.499	66.09	65.54	•85	3.1715	3.1877	51
3	89	1.000	398 • 150	1.499	66.09	65.68	•62	3.6112	3.6267	43
3	90 91	1.000	423 • 150 448 • 150	1.499 1.499	66.09 66.09	65.68 65.72	•62 •57	4.0317 4.4441	4.0505 4.4642	46 45
3	92	1.000	473.150	1.499	66.09	65.76	•50	4.8504	4.8706	41
3	93	1.000	498.150	1.499	66.09	65.80	.44	5.2517	5.2716	38
3	94	1.000	523.150	1.499	66.09	65.68	•63	5.6367	5.6682	55
3	95 96	1.000	548.150 369.960	1.499 1.998	66.09 88.12	65•87 87•76	•33 •41	6.0430 3.6295	6.0613 3.6361	30 18
3	97	1.000	373.150	1.998	88.12	87.33	•91	3.7044	3.7201	42
3	98	1.000	398.150	1.998	88.12	87.44	•78	4.3357	4.3554	45
3	99	1.000	423.150	1.998	88.12	87.45	.77	4.9386	4.9640	51
3	100	1.000	448.150	1.998	88.12	87.55	•66	5.5293	5.5559	48
3	101 102	1.000	473.150 498.150	1.998 1.998	88.12 88.12	87.61 87.71	•59 •48	6.1079 6.6814	6.1361 6.70 7 4	 46 39
3	103	1.000	523.150	1.998	88.12	87.78	•39	7.2478	7.2719	33
3	104	1.000	548.150	1.998	88.12	87.86	•30	7.8101	7.8308	26
3	105	1.000	373 - 150	2.498	110.16	109.65	•46	4.0581	4.0642	15
3	106 107	1.000	398 • 150 423 • 150	2.498 2.498	110.16 110.16	109.38 109.46	•71 •63	4.8940 5.6975	4.9111 5.7193	~. 35 ~. 38
3	108	1.000	448.150	2.498	110.16	109.40	•52	6.4818	6.5048	- .35
3	109	1.000	473.150	2.498	110.16	109.70	•42	7.2518	7.2746	31
3	110	1.000	498.150	2.498	110.16	109.81	• 31	8.0128	8.0328	25
3	111 112	1.000	523 • 150 548 • 150	2.498 2.498	110.16	109.94	•19	8.7677 9.5154	8.7818 9.5235	16 08
3	113	1.000	369.960	2.490	110.16 132.19	110.05 132.47	•10 - •22	4.1300	4.1284	•04
3	114	1.000	373.150	2.998	132.19	132.13	•05	4.2708	4.2713	01
3	115	1.000	398.150	2.998	132.19	131.61	•44	5.3287	5.3386	19
3	116 117	1.000	423.150 448.150	2.998 2.998	132.19	131.62	•43 •28	6.3429 7.3380	6.3583 7.3516	24 19
3	118	1.000	473.150	2.998	132.19	131.82 132.63	33	8.3472	8.3268	•24
3	119	1.000	498.150	2.998	132.19	132.17	•02	9.2874	9.2886	01
3	120	1.000	523.150	2.998	132.19	132.31	09	10.2480	10.2398	•08
3	121 122	1.000	548 • 150	2.998	132.19	132.43	18	11.2005	11.1822	•16
3	123	1.000	373.150 398.150	3.497 3.497	154.22 154.22	154.49 153.87	 17 •23	4.3884 5.6752	4.3874 5.6802	•02 - •09
3	124	1.000	423.150	3.497	154.22	153.87	•23	6.9144	6.9230	12
3	125	1.000	448.150	3.497	154.22	154.14	•05	8.1364	8.1392	03
3	126	1.000	473.150	3.497	154.22	154.35	09	9.3432	9.3372	•06
3	127 128	1.000	498 • 150 523 • 150	3.497 3.497	154.22 154.22	154.55 154.71	21 32	10.5398 11.7274	10.5214 11.6944	•18 •28
.3	129	1.000	548.150	3.497	154.22	154.85	41	12.9068	12.8582	•38
3	130	1.000	369.960	3.997	176.25	178.48	-1.25	4.2486	4.2470	.04
3	131	1.000	373.150	3.997	176.25	176.55	17	4.4502	4.4496	•01
3	132 133	1.000 1.000	398 • 150 423 • 150	3.997 3.997	176.25 176.25	175.63 175.88	•35 •21	5.9650 7.4443	5.9729 7.4531	13 12
		,	1200100	20271	170027	. , , , , , ,	0 4 1	107772	707221	

Table 7. (Continued)

		,								
ID	Data Point	Weight	Temp.	Dens exp	o t	Density calc_	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mol/L	kg/m ³	kg/m ³	%	MPa	MPa	Z
333333333333333333333333333333333333333	No. 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 180	1.000 1.000	448.150 473.150 498.150 523.150 548.150 373.150 423.150 448.150 473.150 498.150 523.150 548.150 473.150 498.150 523.150 548.150 523.150 548.150 523.150 548.150 523.150 548.150 523.150 548.150 523.150 448.150 473.150 498.150 473.150 498.150 523.150 548.150 548.150	mol/L 3.997 3.997 3.997 3.997 3.997 3.997 3.997 4.496 4.496 4.496 4.496 4.496 4.996 4.996 4.996 4.996 4.996 4.996 4.996 4.996 4.997 5.995	kg/m³ 176.25 176.25 176.25 176.25 176.25 176.25 176.25 176.25 176.25 198.28 19	kg/m ² 176.27 176.53 176.78 177.00 177.29 196.07 196.75 197.39 198.01 198.43 199.00 199.21 212.79 217.08 218.50 219.42 220.00 219.04 219.56 221.08 264.89 256.35 259.68 261.66 262.81 263.54 264.65 307.03 305.84 305.85 306.68 307.34 307.98 308.11 308.31 308.48 351.48 351.23 351.03 351.51 351.78 352.07 352.20 395.92	0116304259 1.13 .78 .45 .1407233647 3.54 1.49 .83 .41 .14 .58 .343519 3.13 1.81 1.04 .60 .32 .14 .60 .60 .60 .60 .60 .60 .60 .60 .60 .60	MPa 8.91·15 10.3655 11.8125 13.2523 14.6942 4.4826 6.2305 7.9652 9.6998 11.4284 13.1510 14.8694 16.5808 4.5049 6.4959 8.5133 10.5439 12.5765 14.5108 16.5352 18.6691 4.2708 4.5758 7.1657 9.8680 12.6170 15.3862 18.1615 20.9488 23.7182 4.4725 4.8910 8.3826 12.0192 15.7246 19.4828 23.7182 4.4725 4.8910 8.3826 12.0192 15.7246 19.4828 23.2115 26.9585 30.7045 5.5587 6.1504 10.9472 15.9019 20.9044 25.9493 30.9832 9.0068	MPa 8.9107 10.3522 11.7812 13.1996 14.6087 4.4857 6.2498 7.9874 9.7101 11.4211 13.1221 14.8140 16.4973 4.5149 6.5403 8.5629 10.5812 12.5940 14.6004 16.5999 18.5919 4.2702 4.5980 7.2565 9.9698 12.7048 15.4493 18.1961 20.9410 23.6810 4.4878 4.9268 8.4810 12.1299 15.8219 19.5351 23.2569 26.9794 30.6972 5.6039 6.2121 11.0694 16.0195 21.0144 26.0295 31.0500 9.0845	*** **** **** **** **** **** **** ****
3	181	1.000	373.150	8.993	396.56	395.64	•23	9.8123	9.9297	-1.18
3 3	182 183	1.000	398.150 423.150	8.993 8.993	396.56 396.56	395.74 395.85	•21 •18	16.4623 23.1801	16.6064 23.3383	87 68
3	184	1.000	448.150	8.993	396.56	395.72	•21	29.8676	30.0913	74
3 3	185 186	1.000	369.960 373.150	9.992 9.992	440.62 440.62	440.44 440.03	•04 •14	17.3357 18.3824	17.3862 18.5461	29 88
3	187	1.000	398.150	9.992	440.62	439.81	•19	27.3699	27.6442	99

Table 7. (Continued)

,	, , , , , , , , , , , , , , , , , , , ,	, •								
10	Data Point	Weight	Temp.		sity ot	Density calc		Pexpt	Pcalc	Pressure Diff.
	No.		K	mo1/L	kg/m ³	kg/m ³	%	MPa	MPa	Z/p
26 26 26 26 26 26 26 26 26 26 26 26 26 2	Point No. 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 234 235 236	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 1.000	K 373.150 383.150 393.150 403.150 413.150 363.150 393.150 403.150 403.150 363.150 373.150 363.150 373.150 363.150 373.150 363.150 373.150 383.150 373.150 383.150 373.150 383.150 373.150 383.150 373.150 383.150 373.150 363.150 373.150	mol/L 7.257 7.257 7.257 7.257 7.257 7.257 7.710 7.710 7.710 7.710 7.710 7.710 8.164 8.164 8.164 8.164 8.164 8.617	kg/m3 320.00 320.00 320.00 320.00 320.00 320.00 340.00 340.00 340.00 340.00 360.00 360.00 360.00 360.00 360.00 380.00 380.00 380.00 380.00 380.00 380.00 380.00 380.00 400.00 400.00 400.00 410.00 410.00 410.00 410.00 410.00 410.00 410.00 410.00 42	calc kg/m3 331.01 326.39 325.33 324.36 323.52 349.40 347.56 345.91 345.96 343.35 343.43 366.03 363.96 363.50 364.00 363.34 362.74 380.82 381.36 381.32 381.94 382.27 381.77 381.91 400.11 401.42 401.47 401.40 401.28 401.13 400.98 409.26 410.01 410.99 411.01 410.99 411.01 410.95 410.86 410.75 411.03 419.02 420.08 420.16 420.15 420.53 420.41 420.29 430.03	Diff. % -3.33 -1.96 -1.64 -1.34 -1.09 -2.69 -2.18 -1.71 -1.7297 -1.00 -1.65 -1.0996 -1.1092752236355159465003355159465003353735322824180024252321182523	MPa 5.3937 6.8647 8.4337 10.0028 11.5718 4.2169 5.9821 7.7473 9.6105 11.2776 13.1409 4.9033 6.8647 8.9241 11.0815 13.1409 15.2003 3.5304 5.8840 8.2376 10.6892 13.1409 15.4945 17.9462 5.0014 7.8453 10.5912 13.3370 16.0829 18.8288 21.5746 3.1381 6.0801 9.1202 12.0622 15.0042 17.9462 20.8882 21.5746 3.1381 6.0801 9.1202 12.0622 15.0042 17.9462 20.8882 23.9282 4.2169 7.4531 10.5912 13.7293 16.9655 20.1036 23.2418 26.4780 5.7859 9.1202	MPa 5.1269 6.6492 8.1975 9.7631 11.3411 3.9629 5.6812 7.4395 9.2223 11.0223 12.8350 4.6147 6.6189 8.6547 10.7121 12.7852 14.8699 3.4836 5.7809 8.1146 10.4727 12.8483 15.2369 17.6352 4.9903 7.6760 10.3864 13.1144 15.8552 18.6054 21.3622 3.2105 6.0794 8.9770 11.8944 14.8261 17.7681 20.7174 23.6714 4.3406 7.4407 10.5627 13.7002 16.8486 20.0047 23.1657 26.3296 5.7711 9.1145	5.20 3.24 2.88 2.45 2.03 6.41 5.30 4.14 4.21 2.32 2.38 6.25 3.71 3.11 3.45 2.78 2.22 1.34 1.78 1.52 2.07 2.28 1.69 1.76 .22 2.21 1.97 1.70 1.44 1.20 1.99 -2.25 .01 1.60 1.41 1.20 1.00 .82 1.08 -2.85 .17 .27 .21 .69 .49 .33 .56 .26 .06
26 26 26 26 26 26 26	237 238 239 240 241 242	1.000 1.000 1.000 1.000 1.000	363.150 373.150 383.150 393.150 403.150 413.150	9.751 9.751 9.751 9.751 9.751 9.751	430.00 430.00 430.00 430.00 430.00 430.00	429.91 430.18 430.37 430.17 429.98 430.42	.02 04 09 04 .00	12.4544 15.8868 19.3191 22.6534 25.9876 29.5180	12.4742 15.8451 19.2237 22.6071 25.9931 29.3797	16 .26 .50 .20 02
26	243	1.000	333.150	9.978	440.00	439.77	•05	3.9227	3.9617	99

Table 7. (Continued)

		,								
1D	Data	Weight	Temp.	Dens	sity	Density	Density	Pexpt	Pcalc	Pressure
	Point			exp	1		Diff.	expi	Carc	Diff.
	No.		K	mo1/L	kg/m ³	calc kg/m ³	%	MPa	MPa	%
26	244	1.000	343.150	9.978	440.00	440.03	01	7.5511	7.5453	•08
26	245	1.000	353.150	9.978	440.00	440.15	04	11.1796	11.1452	•31
25	246	1.000	363.150	9.978	440.00	439.81	.04	14.7100	14,7562	31
25	247	1.000	373.150	9.978	440.00	439.87	•03	18.3384	18.3744	20
26	248	1.000	383.150	9.978	440.00	439.90	• 02	21.9669	21.9969	14
26	249	1.000	393.150	9.978	440.00	439.62	•09	25.4973	25.6213	48
26	250	1.000	403.150	9.978	440.00	439.37	•14	29.0277	29.2457	75
26	251	1.000	413.150	9.978	440.00	439.43	•13	32.6561	32.8686	65
26	252	1.000	333.150	10.205	450.00	449.22	•17	5.6879	5.8507	-2.78
26	253	1.000	343.150	10.205	450.00	449.58	•09	9.6105	9.7106	-1.03
26	254	1.000	353.150	10.205	450.00	449.45	•12	13.4351	13.5808	-1.07
25	255	1.000	363.150	10.205	450.00	449.32	•15	17.2597	17.4572	-1.13
25	256	1.000	373.150	10.205	450.00	449.20	.18	21.0843	21.3369	-1.18
26	257	1.000	383.150	10.205	450.00	449.39	.14	25.0070	25.2175	84
26	258	1.000	393.150	10.205	450.00	449.02	•22	28.7335	29.0970	-1.25
26	259	1.000	403.150	10.205	450.00	449.45	•12	32.7542	32.9739	67
26	260	1.000	413.150	10.205	450.00	449.13	•19	36.4807	36.8466	99
26	261	1.000	323.150	10.431	460.00	459.54	. 10	3.9227	4.0265	- 2.58
26	262	1.000	333.150	10.431	460.00	459.89	• 02	8.1395	8.1683	35
26	263	1.000	343.150	10.431	460.00	459.44	•12	12.1602	12.3185	-1.29
26	264	1.000	353.150	10.431	460.00	459.38	•14	16.2790	16.4734	-1.18
26	265	1.000	363.150	10.431	460.00	459.61	•09	20.4959	20.6299	65
25	266	1.000	373.150	10.431	460.00	459.27	•16	24.5166	24.7857	-1.09
26	267	1.000	383.150	10.431	460.00	458.74	•28	28.4393	28.9390	-1 -73
26	268	1.000	393.150	10.431	460.00	459.21	•17	52.7542	33.0881	-1.01
26	269	1.000	403.150	10.431	460.00	458.99	• 22	36.7749	37.2316	-1 -23
26	270	1.000	413.150	10.431	460.00	459 • 21 469 • 55	•17 •10	40.9918	41.3686	91 -5.22
26	271	1.000	313.150 323.150	10.658	470.00		•11	1.9613 6.3743	2.0694	-2.19
26	272 273	1.000	333.150	10.658 10.658	470.00 470.00	469.48 469.08	•20	10.6892	6.5168 10.9698	-2.19 -2.56
26 26	274	1.000	343.150	10.658	470.00	469.00	•14	15.2003	15.4248	-1.46
26	275	1.000	353.150	10.658	470.00	469.00	•21	19.5152	19.8792	-1.83
25	276	1.000	363.150	10.658	470.00	468.98	• 22	23.9282	24.3309	-1.65
25	277	1.000	373.150	10.658	470.00	468.97	•22	28.3412	28.7779	-1.52
25	278	1.000	383.150	10.658	470.00	468.98	•22	32.7542	33.2188	-1.40
26	279	1.000	393.150	10.658	470.00	468.79	•26	37.0691	37.6524	-1.55
26	280	1.000	403.150	10.658	470.00	468.84	•25	41.4821	42.0775	-1.41
26	281	1.000	413.150	10.658	470.00	469.08	•20	45.9932	46.4932	-1.08
26	282	1.000	313.150	10.885	480.00	478.83	•24	4.4130	4.7554	-7.20
26	283	1.000	323.150	10.885	480.00	479.03	•20	9.2183	9.5356	-3.33
26	284	1.000	333.150	10.885	480.00	478.92	•23	13.9254	14.3144	-2.72
26	285	1.000	343.150	10.885	480.00	478.84	•24	18.6326	19.0895	-2.39
26	286	1.000	353.150	10.885	480.00	479.01	•21	23.4379	23.8590	-1.77
26	287	1.000	363.150	10.885	480.00	478.96	•22	28 • 1451	28.6213	-166
26	288	1.000	373.150	10.885	480.00	478.93	•22	32.8523	33.3751	-1.57
26	289	1.000	383.150	10.885	480.00	478.92	•22	37.5595	38.1191	-1.47
26	290	1.000	393.150	10.885	480.00	479.29	•15	42.4628	42.8525	91
26	291	1.000	403.150	10.885	480.00	479.14	•18	47.0719	47.5743	-1.06
26	292	1.000	413.150	10.885	480.00	479.17	•17	51.7791	52.2839	97
26	293	1.000	303.150	11.112	490.00	488.63	•28	2.4517	2.8842	-15.00
26	294	1.000	313.150	11.112	490.00	488.96	•21	7.6492	8.0183	-4.60
26	295	1.000	323.150	11.112	490.00	489.23	•16	12.8467	13.1463	-2.28
26	296	1.000	333.150	11.112	490.00	489.25	•15	17.9462	18.2665	-1 - 75
26	297	1.000	343.150	11-112	490.00	489.28	•15	23.0456	23.3776	-1 . 42
26	298	1.000	353.150	11.112	490.00	489.33	-14	28.1451	28.4782	-1-17
26	299	1.000	363.150	11.112	490.00	489.20	•16	33.1465	33.5671	-1.25

Table 7. (Continued)

		,								
ID	Data Point	Weight	Temp.		sity	Density	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mo1/L	kg/m ³	kg/m ³	%	MPa	MPa	76
26 26 26 26 26 26 26 26 26 26 26 26 26 2	Point	Weight 1.000		ex		Density calc kg/m3 489.29 489.22 489.03 489.18 489.19 498.86 498.93 499.02 499.01 499.00 499.18 499.07 499.13 499.08 498.93 503.73 503.80 504.10 504.18 504.10 504.18 504.10 504.15 504.15 504.13 503.90 508.96 509.21 509.26	Diff.			Diff.
26 26 26 26 26 26 26 26 26 26 26 26 26 2	333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	313.150 323.150 343.150 353.150 363.150 373.150 393.150 403.150 303.150 303.150 313.150 323.150 343.150 343.150 353.150 363.150 363.150 363.150 363.150 363.150 363.150 363.150 363.150 363.150 363.150	11.565 11.565 11.565 11.565 11.565 11.565 11.565 11.565 11.565 11.565 11.679 11.679 11.679 11.679 11.679 11.679 11.679 11.679 11.679 11.679 11.679	510.00 510.00 510.00 510.00 510.00 510.00 510.00 510.00 510.00 515.00 515.00 515.00 515.00 515.00 515.00 515.00 515.00 515.00 515.00	509.26 509.34 509.26 509.07 509.23 509.27 509.27 509.27 509.25 509.14 509.18 513.95 514.17 514.21 514.29 514.39 514.37 514.27 514.34 514.43 514.43 514.43 514.42	.13 .14 .18 .15 .14 .16 .14 .15 .17 .16 .20 .16 .15 .14 .12 .15 .14 .12 .11 .11	22.0650 27.8509 33.5387 39.4227 45.2087 50.8965 56.6824 62.3703 67.9601 73.6479 6.4724 12.6506 18.7307 24.8108 30.8909 36.7749 42.8551 48.7391 54.7211 60.7032 66.5872 72.3731 78.1590	22.4218 28.2744 34.1073 39.9200 45.7124 51.4839 57.2344 62.9636 68.6712 74.3572 6.9507 13.0641 19.1550 25.2236 31.2701 37.2942 43.2959 49.2748 55.2308 61.1638 67.0736 72.9601 78.8232	-2.25 -1.59 -1.59 -1.67 -1.25 -1.10 -1.14 96 94 -1.04 95 -6.88 -3.17 -2.21 -1.64 -1.21 -1.39 -1.02 -1.09 92 75 73 80 84

Table 7. (Continued)

01	Data Point No.	Weight	Temp.	Den: exp	sity ot kg/m ³	Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff.
26 26 26 26 26 26 26 26 26 26 26 26 26 2	Point No. 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402	1.000 1.000	K 283.150 293.150 303.150 313.150 343.150 353.150 383.150 383.150 393.150 403.150 313.150 333.150 343.150 393.150 313.150 313.150 323.150 323.150 323.150 323.150 323.150 333.150 343.150 353.150 363.150 373.150 383.150 373.150 383.150 373.150 383.150 373.150 383.150 393.150	mol/L 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.792 11.906 11	kg/m³ 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 520.00 525.00	519.00 519.14 519.32 519.38 519.31 519.29 519.44 519.42 519.42 519.40 524.59 524.45 524.73 524.69 524.71 524.83 524.85 524.87 524.86 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.71 524.83 524.85 524.74 529.56 529.68 529.73 529.68 529.73 529.67 529.81 529.81 529.78 529.77 529.82 529.78 529.77 529.82 529.77 529.82 529.77 529.82 529.77 529.82 529.77 529.82 529.77 529.82 529.77 529.82 529.77 529.82 529.77 529.82	01ff. 19 17 17 17 13 12 13 14 11 10 11 10 11 11 12 08 10 05 06 06 07 05 06 06 07 05 08 09 06 07 05 08 09 06 07 05 08 09 06 07 05 08 09 06 07 07 05 08 09 06 07 07 07 08 09 08 09 09 08 09 09 09 08 09 09 09 09 09 09 09 09 09 09 09 09 09	MPa 2.5497 8.9241 15.2003 21.5746 27.8509 34.0291 40.2073 46.4835 52.6617 58.7418 64.9200 70.9021 76.9822 82.9643 5.1975 11.6699 18.3384 24.8108 31.2832 37.6575 44.1299 50.6023 56.9766 63.3510 69.6272 75.9035 82.0817 88.2598 .9807 7.7473 14.6119 21.3785 28.0470 34.8136 41.4821 48.0526 54.6230 61.1935 67.7640 74.1383 80.7087 87.0831 93.4574 3.7265 10.7873 17.7500 24.7128	3.0055 9.3532 15.6740 21.9690 28.2388 34.4836 40.7035 46.8984 53.0684 59.2133 65.3332 71.4279 77.4975 83.5420 5.4033 11.9662 18.4989 25.0026 31.4780 37.9257 44.3459 50.7386 57.1041 63.4424 69.7536 76.0377 82.2948 88.5250 1.1990 8.0179 14.8006 21.5497 28.2666 34.9523 41.6075 48.2325 54.8277 61.3933 67.9295 74.4364 80.9143 87.3633 93.7836 3.8135 10.8602 17.8674 24.8375	Diff- % -15.16 -4.59 -3.02 -1.80 -1.37 -1.32 -1.2288778063746669 -3.81 -2.4887776271492722141818182630 -18.21 -3.38 -1.27797840303737332440253235 -2.286676650
			293.150	12-132	535.00	534.82	•03	17.7500	17.8674	66

Table 7. (Continued)

		,								
ID	Data	Weight	Temp.		sity	Density	Density	Pexpt	Pcalc	Pressure
	Point No.		K	mol/L	kg/m ³	calc_ kg/m ³	Diff.	MPa	MPa	Diff.
	NO.		IX.	IIIO17 E	Kg/III	Kg/III	/0	MFa	Mra	/0
26	412	1.000	403.150	12.132	535.00	534.96	•01	92.6728	92.7151	05
26	413	1.000	413.150	12.132	535.00	535.01	00	99.3414	99.3299	•01
26	414	1.000	273.150	12.246	540.00	540.01	00	6.6685	6.6625	•09
26	415	1.000	283.150	12.246	540.00	539.97	.00	13.9254	13.9417	12
26	416	1.000	293.150	12.246	540.00	540.01	00	21.1824	21.1780	.02
26	417	1.000	303.150	12.246	540.00	539.96	•01	28.3412	28.3740	12
26	418	1.000	313.150	12.246	540.00	539.96	-01	35.5001	35.5316	09
26	419	1.000	323.150	12.246	540.00	540.01	00	42.6589	42.6520	.02
26	420	1.000	333.150	12.246	540.00	539.98	•00	49.7197	49.7363	03
26	421	1.000	343.150	12.246	540.00	540.10	02	56.8786	56.7852	•16
26	422	1.000	353.150	12.246	540.00	540.04	01	63.8413	63.7993	•07
26 26	423 424	1.000	363 • 150 373 • 150	12.246 12.246	540.00 540.00	540.12 540.14	02 03	70.9021 77.8648	70.7789 77.7247	.17 .18
26	425	1.000	383.150	12.246	540.00	540.14	05	84.9256	84.6369	•34
26	426	1.000	393.150	12.246	540.00	540.25	05	91.7902	91.5160	•30
26	427	1.000	403.150	12.246	540.00	540.17	03	98.5568	98.3623	•20
26	428	1.000	273.150	12.359	545.00	545.08	01	9.8067	9.7575	•50
26	429	1.000	283.150	12.359	545.00	545.12	02	17.3578	17.2741	.48
26	430	1.000	293.150	12.359	545.00	545.09	02	24.8108	24.7444	•27
26	431	1.000	303.150	12.359	545.00	545.12	02	32.2639	32.1711	•29
26	432	1.000	313.150	12.359	545.00	545.19	04	39.7169	39.5562	.41
26	433	1.000	323.150	12.359	545.00	545.19	04	47.0719	46.9013	•36
26	434	1.000	333.150	12.359	545.00	545.24	04	54.4269	54.2074	• 41
26	435	1.000	343.150	12.359	545.00	545.32	06	61 • 781 9	61 • 4753	•50
26	436	1.000	353.150	12.359	545.00	545.23	04	68.9407	68.7059	.34
26	437	1.000	363 • 150	12.359	545.00	545.19	03	76.0996	75.8998	.26
26 26	438 439	1.000	373.150 383.150	12.359 12.359	545.00 545.00	545.27 545.30	05 05	83.3565 90.5154	83.0573 90.1792	•36 •37
26	440	1.000	393.150	12.359	545.00	545.35	05	97.6742	97.2658	•37
26	441	1.000	273 • 150	12.472	550.00	550.32	06	13.3370	13.1105	1.73
26	442	1.000	283.150	12.472	550.00	550.42	08	21.1824	20.8694	1.50
26	443	1.000	293.150	12.472	550.00	550.44	08	28.9296	28.5786	1.23
26	444	1.000	303.150	12.472	550.00	550.52	09	36.6769	36.2409	1.20
26	445	1.000	313.150	12.472	550.00	550.52	10	44.3261	43.8586	1.07
26	446	1.000	323.150	12.472	550.00	550.58	10	51.9752	51.4332	1.05
26	447	1.000	333.150	12.472	550.00	550.47	09	59.4283	58.9660	.78
26	448	1.000	343.150	12.472	550.00	550.60	11	67.0775	66 • 4580	•93
26	449	1.000	353.150	12.472	550.00	550.58	10	74.5305	73 • 91 00	•84
26	450	1.000	363.150	12.472	550.00	550.50	09	81 • 8855	81.3227	•69
26	451	1.000	373 • 150	12.472	550.00	550.47	08	89.2405	88.6969	•61
26 26	452	1.000	383.150	12.472	550.00	550.55	10	96 • 6936	96.0331 16.7339	•69
26	453 454	1.000	273 • 150 283 • 150	12.586 12.586	555.00 555.00	555.57	10 10	17.1616 25.2031	24.7401	2.56 1.87
26	455	1.000	293.150	12.586	555.00	555.57 555.53	10	33.1465	32.6933	1.39
26	456	1.000	303.150	12.586	555.00	555.55	10	41.0899	40.5964	1.22
26	457	1.000	313.150	12.586	555.00	555.61	11	49.0333	48.4516	1.20
26	458	1.000	323.150	12.586	555.00	555.62	11	56.8786	56.2607	1.10
26	459	1.000	333.150	12.586	555.00	555.67	12	64.7239	64.0252	1.09
26	460	1.000	343.150	12.586	555.00	555.57	10	72.3731	71.7461	•87
26	461	1.000	353.150	12.586	555.00	555.53	09	80.0223	79.4244	•75
26	462	1.000	363.150	12.586	555.00	555.60	11	87.7695	87.0609	•81
26	463	1.000	373.150	12.586	555.00	555.62	11	95.4187	94.6565	.81
26	464	1.000	383.150	12.586	555.00	555.60	11	102.9698	102.2118	.74
26	465	1.000	273.150	12.699	560.00	560.67	12	21.1824	20.6403	2.63
26	466	1.000	283.150	12.699	560.00	560.60	11	29.4200	28 • 8991	1.80
26	467	1.000	293.150	12.699	560.00	560.71	13	37.7556	37.1014	1.76

Table 7. (Continued)

1 D	Data Point No.	Weight	Temp. K	Dens exp mol/L	sity ot kg/m ³	Density calc kg/m ³	Density Diff.	P _{exp} t MPa	Pcalc MPa	Pressure Diff.
26 26 26 26 26 26 26 26 26 26 26 26 26 2	Point No. 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507	1.000 1.000	303.150 313.150 323.150 333.150 343.150 363.150 273.150 283.150 293.150 303.150 333.150 343.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 233.150 333.150 333.150 333.150 333.150 333.150 333.150 333.150 333.150 333.150 333.150 333.150 333.150 273.150 283.150 293.150 303.150 313.150 293.150 303.150 313.150 313.150 313.150 313.150 313.150 313.150 313.150 313.150	expmol/L 12.699 12.699 12.699 12.699 12.699 12.699 12.699 12.813	kg/m³ 560.00 560.00 560.00 560.00 560.00 560.00 560.00 565.00 565.00 565.00 565.00 565.00 570.00 570.00 570.00 570.00 570.00 570.00 570.00 570.00 575.00	calc kg/m ³ 560.77 560.68 560.82 560.70 560.66 560.73 565.75 565.62 565.66 565.61 565.65 565.60 570.70 570.68 570.62 570.62 570.62 570.62 570.62 570.62 570.63 570.60 570.63 570.63 570.63 570.60	Diff*	MPa 45.9932 54.0346 62.2722 70.2156 78.1590 86.1024 93.9477 101.8911 25.4973 33.9310 42.4628 50.8965 59.3302 67.5678 75.8054 84.0430 92.1825 100.3220 30.1064 38.8343 47.5623 56.1921 64.8220 73.3537 81.8855 90.2212 98.6549 35.0097 44.0319 52.9559 61.7819 70.6079 79.4339 88.1618 96.7916 40.1092 49.3274 58.5457 67.5678 76.6880	MPa 45.2503 53.3482 61.3970 69.3981 77.3530 85.2625 93.1278 100.9497 24.8429 33.3595 41.8162 50.2161 58.5619 66.8554 75.0984 83.2923 91.4381 99.5371 29.3552 38.1349 46.8513 55.5076 64.1065 72.6501 81.1401 89.5780 97.9653 34.1910 43.2393 52.2208 61.1389 69.9962 78.7951 87.5373 96.2246 39.3645 48.6870 57.9391 67.1244 76.2456	1.64 1.29 1.43 1.18 1.04 .99 .88 .93 2.63 1.71 1.55 1.35 1.31 1.07 .94 .90 .81 .79 2.56 1.83 1.52 1.23 1.12 .97 .92 .70 2.39 1.83 1.105 .87 .81 .71 .59 1.89 1.32 1.05 .66 .58
26 26 26 26 26	507 508 509 510 511	1.000 1.000 1.000 1.000	313.150 323.150 333.150 343.150 273.150	13.153 13.153 13.153 13.153 13.266	580.00 580.00 580.00 580.00 585.00	580.34 580.30 580.24 580.15 585.53	06 05 04 03 09	76.6880 85.7101 94.6342 103.4602 45.5029	76.2456 85.3051 94.3049 103.2468 44.8904	•58 •47 •35 •21 1•36
26 26 26 26 26 26 26 26	511 512 513 514 515 516 517	1.000 1.000 1.000 1.000 1.000 1.000	273 • 150 283 • 150 293 • 150 303 • 150 313 • 150 323 • 150 333 • 150	13.266 13.266 13.266 13.266 13.266 13.266 13.266	585.00 585.00 585.00 585.00 585.00 585.00 585.00	585.53 585.44 585.33 585.20 585.21 585.13 585.03	09 07 06 03 04 02	45.5029 55.0153 64.4297 73.7460 83.1604 92.3786 101.4988	44.8904 54.4927 64.0210 73.4790 82.8696 92.1951 101.4579	1.36 .96 .64 .36 .35 .20
26 26 26 26 26 26	518 519 520 521 522 523	1.000 1.000 1.000 1.000 1.000	273 • 150 283 • 150 293 • 150 303 • 150 313 • 150 323 • 150	13.380 13.380 13.380 13.380 13.380 13.380	590.00 590.00 590.00 590.00 590.00	590.09 590.02 589.95 589.93 589.83 589.71	02 00 .01 .01 .03	50.8965 60.7032 70.4117 80.1203 89.6328 99.0472	50.7836 60.6714 70.4816 80.2179 89.8833 99.4805	.22 .05 10 12 28 44

Table 7. (Continued)

ID	Data Point No:	Weight	Temp.	Den ex mol/L	sity pt kg/m ³	Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
1201 1202 1203 1204 1205 1206 1207 1208 1209 1210	524 525 526 527 528 529 530 531 532 533	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000	16.799 16.775 16.751 16.726 16.701 16.675 16.648 16.621 16.594 16.567	740.78 739.73 738.67 737.59 736.48 735.31 734.15 732.96 731.76 730.57	739.91 738.86 737.79 736.71 735.62 734.52 733.40 732.26 731.12 729.95	.12 .12 .12 .12 .11 .10 .09 .09	34.7214 31.2781 27.8346 24.3913 20.9479 17.5048 14.0615 10.6186 7.1754 3.7326	37.6015 34.1200 30.6798 27.1815 23.6556 19.9806 16.3674 12.7208 9.1096 5.5597	-7.66 -8.33 -9.27 -10.26 -11.45 -12.39 -14.09 -16.53 -21.23 -32.86
1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012	534 535 536 537 538 539 540 541 542 543 544	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	100.000 100.000 100.000 100.000 100.000 100.000 100.000 100.000 100.000 100.000 100.000	16.594 16.561 16.530 16.503 16.476 16.448 16.420 16.397 16.374 16.356 16.338 16.321	731 • 74 730 • 28 728 • 94 727 • 74 726 • 53 725 • 29 724 • 05 723 • 04 722 • 03 721 • 24 720 • 46 719 • 70	730.90 729.55 728.29 727.13 725.95 724.76 723.55 722.57 721.58 720.58 719.82 719.06	.11 .10 .09 .08 .08 .07 .07 .07 .06 .09	35.7539 31.6219 27.8341 24.3910 20.9477 17.5047 14.0615 11.3072 8.5527 5.7985 3.7328 1.6670	38.3478 33.8520 29.8013 26.1906 22.6289 19.0268 15.4877 12.6299 9.8048 7.6069 5.4530 3.3899	-6.76 -6.59 -6.60 -6.87 -7.43 -8.00 -9.21 -10.47 -12.77 -23.77 -31.55 -50.82
501 502 503 504 505 506 507 508 509 510 511 512 513	546 547 548 549 550 551 552 553 554 555 556 557 558	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	110.000 110.000 110.000 110.000 110.000 110.000 110.000 110.000 110.000 110.000 110.000 110.000	16.376 16.347 16.318 16.288 16.259 16.229 16.201 16.178 16.155 16.131 16.114 16.098 16.087 16.082	722.15 720.84 719.57 718.26 716.96 715.67 714.41 713.39 7112.39 711.35 710.60 709.89 709.40 709.18	721 • 41 720 • 10 718 • 88 717 • 63 716 • 37 715 • 14 713 • 97 712 • 97 711 • 93 710 • 85 710 • 09 709 • 35 708 • 85 708 • 61	.10 .10 .10 .09 .08 .07 .06 .06 .07 .07 .07 .08 .08	34.9955 31.2768 27.8332 24.3900 20.9466 17.6413 14.5424 11.9258 9.2401 6.4857 4.5578 2.6985 1.4591	37.1324 33.3625 29.7598 26.1237 22.5535 19.0598 15.6992 13.0318 10.4411 7.7448 5.8500 4.0601 2.8237 2.2849	-5.75 -6.25 -6.47 -6.64 -7.12 -7.44 -7.37 -8.49 -11.50 -16.26 -22.09 -33.54 -48.33 -61.66
601 602 603 604 605 606 607 608 609 610 611 612 613 614	560 561 562 563 564 565 566 567 568 569 570 571 572 573	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000	16.180 16.141 16.104 16.073 16.041 16.008 15.977 15.952 15.897 15.897 15.862 15.853 15.848	713.50 711.78 710.16 708.76 707.36 705.91 704.54 703.45 702.18 701.02 700.17 699.45 699.08 698.84	712.77 711.12 709.54 708.21 706.86 705.48 704.14 703.06 701.79 700.63 699.74 699.00 698.62 698.39	.10 .09 .09 .08 .07 .06 .06 .06 .05 .06 .06 .06	36.3748 31.9673 27.8350 24.3919 20.9485 17.5053 14.1999 11.5833 8.5533 5.7991 3.7334 2.0118 1.1512 .6141	38.3563 33.7323 29.4408 25.8077 22.2216 18.5722 15.1895 12.5220 9.4667 6.7266 4.7320 3.0527 2.2083 1.6608	-5.17 -5.23 -5.45 -5.49 -5.73 -5.74 -6.52 -7.50 -9.65 -13.79 -21.10 -34.10 -47.87 -63.02
401 402	574 575	1.000	130.000 130.000	15.958 15.922	703.72 702.13	703.31 701.74	•06 •06	35.3418 31.4162	36.3798 32.3954	-2.85 -3.02

Table 7. (Continued)

10	Data Point No.	Weight	Temp∙ K	Den: exp mol/L		Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff. %
403 404 405 406 407 408 409 410 411 412 413 414	576 577 578 579 580 581 582 583 584 585 586 587	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	130.000 130.000 130.000 130.000 130.000 130.000 130.000 130.000 130.000 130.000 130.000	15.889 15.855 15.821 15.746 15.719 15.690 15.666 15.648 15.632 15.625 15.620 15.616	700.68 699.16 697.68 694.37 693.16 691.88 690.82 690.05 689.34 689.02 688.79 688.64	700.34 698.85 697.40 694.18 692.96 691.65 690.55 689.75 689.01 688.69 688.46	.05 .04 .04 .03 .03 .04 .04 .05 .05	27.9727 24.3917 20.9484 13.5113 10.7569 7.8647 5.4548 3.7333 2.1495 1.4609 .9789 .6277	28.8070 25.1302 21.6014 13.9329 11.1992 8.3687 6.0411 4.3790 2.8547 2.1678 1.6708 1.3527	-2.90 -2.94 -3.02 -3.03 -3.95 -6.02 -9.71 -14.75 -24.70 -32.61 -41.41 -53.60
701 702 703 704 705 706 707 708 709 710 711 712 713 714	588 589 590 591 592 593 594 595 596 597 598 599 600 601	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	140.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000	15.769 15.727 15.684 15.642 15.605 15.569 15.534 15.504 15.474 15.449 15.426 15.407 15.397 15.389	695.36 693.50 691.63 689.77 688.15 686.53 685.00 683.70 682.34 681.27 680.23 679.42 678.95 678.61	694.91 693.16 691.37 689.55 688.00 686.41 684.93 683.65 682.32 681.21 680.11 679.25 678.72 678.37	.06 .05 .04 .03 .02 .02 .01 .01 .00 .01 .02 .03 .03	36.7881 32.6560 28.5239 24.3920 20.9487 17.5056 14.3378 11.6523 8.8977 6.6255 4.4221 2.7005 1.6676 .9791	37 · 8574 33 · 4459 29 · 1191 24 · 8962 21 · 2887 17 · 7504 14 · 4764 11 · 7402 8 · 9381 6 · 7526 4 · 6574 3 · 0423 2 · 1192 1 · 4433	-2.82 -2.36 -2.04 -2.03 -1.60 -1.38 96 75 45 -1.88 -5.05 -11.24 -21.31 -32.16
801 802 803 804 805 806 807 808 809 810 811 812 813	602 603 604 605 606 607 608 609 610 611 612 613 614	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	160.000 160.000 160.000 160.000 160.000 160.000 160.000 160.000 160.000 160.000 160.000	15.354 15.304 15.258 15.218 15.178 15.137 15.094 15.059 15.024 14.988 14.960 14.938 14.924	677.06 674.88 672.82 671.06 669.31 667.48 665.60 664.06 662.51 660.92 659.70 658.72 658.08	676.98 674.82 672.78 671.04 669.26 667.45 665.59 664.07 662.52 660.94 659.74 658.72 658.10	.01 .01 .00 .01 .00 .01 .00 00 00 	36.4438 31.9674 27.8352 24.3921 20.9487 17.5056 14.0623 11.3080 8.5534 5.7992 3.7335 2.0119	36.6299 32.0922 27.9097 24.4340 21.0403 17.5700 14.0805 11.2808 8.5273 5.7511 3.6738 2.0056 .9517	51 39 27 17 44 37 13 .24 .31 .84 1.62 .32 2.88
901 902 903 904 905 906 907 908 909 910 911 912 913	615 616 617 618 619 620 621 622 623 624 625 626	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	180.000	14.963 14.912 14.858 14.804 14.749 14.701 14.653 14.613 14.571 14.528 14.495 14.462 14.452	652.80 650.40 648.28 646.17 644.37	659.89 657.65 655.36 652.99 650.55 648.46 646.35 644.55 642.74 640.90 639.48 638.03 637.55	01 01 02 03 02 03 03 03 04 05 04	37.4764 33.3443 29.2121 25.0803 20.9483 17.5052 14.1308 11.3076 8.5530 5.7988 3.7330 1.6671 .9786	37.3754 33.1734 28.9623 24.7507 20.6943 17.2164 13.8317 11.0336 8.2277 5.4182 3.3175 1.2636 .6002	.27 .52 .86 1.33 1.23 1.68 2.16 2.48 3.95 7.03 12.52 31.93 63.04

Table 7. (Continued)

ID	Data Point No:	Weight	Temp.	Den: ex; mol/L	sity pt kg/m ³	Density calc kg/m ³	Density Diff.	Pexpt MPa	Scarc MPa	Pressure Diff.
2901 2902 2903 2904 2905 2906 2907 2908 2909 2910 2911 2912	628 629 630 631 632 633 634 635 636 637 638 639	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	200.000 200.000 200.000 200.000 200.000 200.000 200.000 200.000 200.000 200.000 200.000	14.535 14.484 14.431 14.378 14.322 14.265 14.206 14.158 14.109 14.060 14.022 13.984	640.95 638.70 636.38 634.02 631.57 629.04 626.45 624.33 622.19 619.99 618.32 616.64	640.72 638.57 636.36 634.09 631.74 629.33 626.83 624.77 622.65 620.47 618.78 617.06	.04 .02 .00 01 03 05 06 07 07 08 08	34.7203 31.2770 27.8334 24.3903 20.9469 17.5038 14.0606 11.3062 8.5516 5.7974 3.7317 1.6657	35.0966 31.4860 27.8681 24.2837 20.6993 17.0986 13.5460 10.7260 7.9584 5.2118 3.1679 1.1720	-1.07 66 12 .44 1.20 2.37 3.80 5.41 7.45 11.24 17.80 42.13
3001 3002 3003 3004 3005 3006 3007 3008 3009 3010 3011 3012	640 641 642 643 644 645 646 647 648 649 650 651	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000	14.129 14.070 14.010 13.950 13.889 13.826 13.761 13.704 13.645 13.584 13.537 13.490	623.05 620.46 617.82 615.17 612.48 609.70 606.82 604.30 601.69 599.00 596.96 594.88	623.03 620.58 618.06 615.44 612.74 609.93 607.00 604.57 602.06 599.45 597.42	.00 02 04 04 04 03 04 06 07 08	34.7208 31.2774 27.8339 24.3908 20.9474 17.5043 14.0610 11.3067 8.5521 5.7979 3.7321 1.6662	34.7474 31.1005 27.5096 24.0357 20.6331 17.2305 13.8545 11.0074 8.1566 5.3387 3.2695 1.2194	08 .57 1.18 1.48 1.52 1.59 1.49 2.72 4.85 8.60 14.15 36.64
3101 3102 3103 3104 3105 3106 3107 3108 3109 3110 3111 3112	652 653 654 655 656 657 658 659 660 661 662 663	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	240.000 240.000 240.000 240.000 240.000 240.000 240.000 240.000 240.000 240.000 240.000 240.000	13.738 13.669 13.598 13.527 13.454 13.379 13.301 13.236 13.166 13.093 13.035 12.976	605.80 602.75 599.65 596.51 593.28 589.95 586.54 583.65 580.56 577.36 574.82 572.21	605.27 602.48 599.58 596.56 593.41 590.12 586.66 583.77 580.75 577.58 575.10 572.52	.09 .05 .01 01 02 03 02 02 03 04 05	34.7217 31.2784 27.8348 24.3916 20.9482 17.5052 14.0619 11.3076 8.5530 5.7988 3.7331 1.6672	35.3947 31.6114 27.9215 24.3384 20.8073 17.3376 13.9383 11.1980 8.3877 5.6083 3.5014 1.4215	-1.05 -31 .22 .68 .97 .89 .98 1.97 3.40 6.62 17.28
3201 3202 3203 3204 3205 3206 3207 3208 3209 3210 3211 3212 3213 3214	664 665 666 667 668 669 670 671 672 673 674 675 676	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	260.000 260.000 260.000 260.000 260.000 260.000 260.000 260.000 260.000 260.000 260.000 260.000 260.000	13.320 13.245 13.166 13.101 13.034 12.964 12.893 12.818 12.739 12.676 12.611 12.543 12.472 12.422	587.38 584.05 580.60 577.73 574.75 571.69 568.52 561.75 558.98 556.09 553.12 549.98 547.77	587.38 584.18 580.84 578.05 575.15 572.13 568.96 565.64 562.15 559.40 556.52 553.51 550.35 548.14	00 02 04 06 07 08 07 07 08 07 08 07 07	34.7213 31.2780 27.8346 25.0801 22.3253 19.5709 16.8163 14.0619 11.3076 9.2417 7.1760 5.1103 3.0445 1.6673	34.7204 31.1370 27.5877 24.7671 21.9556 19.1867 16.4449 13.7433 11.0035 8.9328 6.8732 4.8477 2.8122 1.4397	.00 .45 .89 1.26 1.68 2.00 2.26 2.32 2.76 3.46 4.41 5.42 8.26 15.81
3301 3302	678 679	1.000	275.000 275.000	13.017 12.934	574.00 570.35	573.85 570.31	.03 .01	34.7209 31.2776	34.8709 31.3188	43 13

Table 7. (Continued)

		,								
10	Data Point No•	Weight	Temp. K	Dens exp mol/L	sity pt kg/m ³	Density calc kg/m ³	Density Diff.	Pexpt MPa	P _{calc}	Pressure Diff.
3303 3304 3305 3306 3307 3308 3309 3310 3311 3312 3313	680 681 682 683 684 685 686 687 688 689 690	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	275.000 275.000 275.000 275.000 275.000 275.000 275.000 275.000 275.000 275.000 275.000 275.000	12.846 12.774 12.697 12.617 12.536 12.451 12.361 12.288 12.210 12.127 12.051 11.974	566.49 563.28 559.89 556.39 552.80 549.05 545.09 541.88 538.43 534.74 531.43 528.01	566.58 563.46 560.19 556.75 553.13 549.31 545.24 542.01 538.59 534.98 531.79 528.41	02 03 05 07 06 05 03 02 03 04 07	27.8341 25.0796 22.3248 19.5704 16.8157 14.0612 11.3070 9.2410 7.1752 5.1095 3.3880 1.6665	27.7497 24.9305 22.0817 19.2874 16.5724 13.8837 11.2077 9.1659 7.0791 4.9791 3.2015 1.4695	.30 .60 1.10 1.47 1.47 1.28 .89 .82 1.36 2.62 5.82 13.41
3401 3402 3403 3404 3405 3406 3407 3408 3409 3410 3411 3412 3413 3414	692 693 694 695 696 697 698 699 700 701 702 703 704 705	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	290.000 290.000 290.000 290.000 290.000 290.000 290.000 290.000 290.000 290.000 290.000 290.000	12.702 12.608 12.511 12.428 12.342 12.251 12.156 12.057 11.949 11.864 11.773 11.672 11.581 11.486	560.13 555.97 551.69 548.06 544.25 540.24 536.06 531.66 526.92 523.17 519.15 514.71 510.69 506.50	560 · 22 556 · 29 552 · 12 548 · 61 544 · 90 540 · 99 536 · 82 532 · 38 527 · 59 523 · 74 519 · 63 515 · 20 511 · 23 506 · 94	02 06 08 10 12 14 13 13 11 09 10	34.7213 31.2781 27.8346 25.0802 22.3255 19.5710 16.8164 14.0622 11.3077 9.2418 7.1761 5.1104 3.3888 1.6674	34.6376 31.0094 27.4860 24.6626 21.8570 19.0643 16.3323 13.6379 10.9363 8.9475 6.9438 4.8915 3.1678 1.4977	.24 .87 1.27 1.69 2.14 2.66 2.96 3.11 3.40 3.29 3.34 4.47 6.98 11.33
2801 2802 2803 2804 2805 2806 2807 2808 2809 2811 2811 2812 2813 2814	706 707 708 709 710 711 712 713 714 715 716 717 718 719	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	300.000 300.000 300.000 300.000 300.000 300.000 300.000 300.000 300.000 300.000 300.000 300.000	12.493 12.395 12.288 12.201 12.109 12.011 11.904 11.790 11.670 11.573 11.462 11.348 11.265 11.174	550.92 546.57 541.86 538.02 533.99 529.64 524.93 519.92 514.61 510.32 505.42 500.42 496.73 492.75	551.07 546.84 542.36 538.55 534.52 530.23 525.64 520.70 515.34 510.98 506.26 501.12 497.40 493.40	03 05 09 10 11 14 15 14 13 17	34.7209 31.2776 27.8341 25.0795 22.3248 19.5703 16.8157 14.0613 11.3070 9.2410 7.1752 5.1095 3.7324 2.3551	34.6014 31.0625 27.4645 24.7096 21.9737 19.2037 16.4035 13.6454 10.9489 8.9427 6.8236 4.83428 3.4948 2.1398	.35 .69 1.35 1.50 1.60 1.91 2.51 3.05 3.27 3.34 5.15 5.51 6.80 10.06

Table 7. (Continued)

ID	Data Point No:	Weight	Temp. K	Dens exp mol/L	nt '	Density calc kg/m ³	Density Diff.	P _{exp} t MPa	Pcalc MPa	Pressure Diff.
24 24 24 24 24 24 24 24 24 24 24 24 24 2	Point No. 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957	1.000 1.000	K 288 • 263 288 • 981 291 • 393 293 • 489 296 • 555 300 • 104 303 • 696 307 • 131 310 • 771 314 • 179 317 • 799 321 • 470 277 • 973 278 • 268 280 • 501 283 • 701 288 • 949 294 • 597 299 • 983 308 • 342 319 • 913 267 • 752 268 • 361 269 • 318 270 • 036 271 • 190 273 • 224	mol/L 11.518 11.518 11.518 11.518 11.516 11.516 11.515 11.514 11.513 11.837 11.837 11.836 11.836 11.838 11.830 12.155 12.155 12.155 12.155	507.93 507.93 507.92 507.89 507.87 507.84 507.82 507.77 507.77 507.77 507.74 507.69 521.97 521.97 521.93 521.84 521.80 521.74 521.65 536.01 536.00 535.99 535.98	calc kg/m ³ 507.82 507.80 507.76 507.72 507.68 507.64 507.61 507.56 507.56 507.56 507.56 521.90 521.89 521.88 521.87 521.88 521.87 535.78 535.78 535.77	02 .02 .03 .03 .04 .04 .04 .04 .01 .01 .01 .01 .01 .00 .00 .00 .01 .01	MPa .9950 1.4087 2.7986 4.0067 5.7744 7.8212 9.8936 11.8760 13.9780 15.9460 18.0380 20.1600 .5517 .7419 2.1805 4.2392 7.6082 11.2241 14.6620 19.9780 27.3000 .4041 .8370 1.5169 2.0268 2.8457 4.2877	MPa 1.0384 1.4541 2.8591 4.0744 5.8539 7.9082 9.9888 11.9708 14.0735 16.0341 18.1195 20.2263 .5835 .7741 2.2070 4.2611 7.6135 11.2173 14.6428 19.9412 27.2340 .5227 .9521 1.6348 2.1413 2.9581 4.3946	-4.18 -3.12 -2.12 -1.66 -1.36 -1.1095796855454533 -5.45 -4.16 -1.205107 .06 .13 .18 .24 -22.69 -12.09 -7.21 -5.35 -3.80 -2.43
24 24 24 24 24 24 24 24 24 24 24 24 24 2	959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986	1.000 1.000	275 • 321 277 • 531 280 • 521 283 • 740 287 • 984 293 • 573 299 • 091 304 • 757 312 • 701 323 • 740 258 • 574 260 • 283 264 • 687 269 • 204 273 • 221 278 • 846 283 • 771 288 • 215 297 • 819 300 • 501 305 • 386 310 • 827 250 • 200 251 • 067 251 • 924 253 • 890 258 • 311 263 • 206	12.154 12.153 12.153 12.152 12.151 12.150 12.149 12.147 12.145 12.446 12.445 12.444 12.443 12.444 12.438 12.438 12.438 12.438 12.438 12.438 12.688 12.688 12.688 12.688	535.95 535.95 535.90 535.88 535.80 535.75 535.64 535.55 548.82 548.74 548.70 548.65 548.65 548.53 548.53 548.49 548.49 548.49 548.49 548.49 548.49 548.49 548.49 548.40 548.49 548.49 548.49 548.49 548.49 548.49 548.49 548.40 548.49 548.49 548.49 548.49 548.49 548.49 548.49 548.40 548.49 559.49 559.49	535.76 535.76 535.77 535.73 535.71 535.69 535.67 535.64 535.59 535.52 548.46 548.47 548.49 548.50 548.50 548.50 548.50 548.50 548.42 548.43 548.42 548.43 548.42 559.02 559.04 559.05 559.08 559.14 559.19	.04 .04 .03 .03 .03 .02 .02 .02 .01 .01 .01 .07 .06 .05 .04 .04 .03 .02 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01	5.7722 7.3345 9.4447 11.7120 14.6930 18.6070 22.4570 26.3950 31.8910 39.4790 .7550 2.0907 5.5231 9.0289 12.1340 16.4630 20.2350 23.6230 27.5270 30.8960 32.9150 36.5800 40.6410 .7767 1.5143 2.2426 3.9104 7.6451 11.7550	5.8794 7.4365 9.5375 11.8018 14.7714 18.6775 22.5134 26.4392 31.9273 39.5054 .9794 2.3072 5.7107 9.1889 12.2680 16.5672 20.3188 23.6893 27.5819 30.9413 32.9515 36.6151 40.6767 1.1235 1.8463 2.5600 4.1969 7.8699 11.9142	-1.82 -1.37 97 76 53 38 25 17 11 07 -22.91 -9.38 -3.29 -1.74 -1.09 63 41 28 20 15 11 10 09 09 15 11 10 09 09 15 11 09 15 11 10 09 15 11 10 09 15 11 10 09 11 10 09 15 11 10 09 15 11 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 09 15 11 09 15 11 09 15 11 09 15 11 09 15 11 10 09 15 11 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 11 10 09 15 10 09 10 09 10 10 10 10 10 10 10 10

Table 7. (Continued)

ID	Data Point No:	Weight	Temp.	Dens exp mol/L	,	Density calc kg/m ³	Density Diff.	P _{exp} t	Pcalc MPa	Pressure Diff•
				11017 L	Kg/III	Kg/ III				/0
24	988	1.000	263.239	12.686	559.40	559.19	• 04	11.7830	11.9417	-1.33
24 24	989 990	1.000	268.014 276.292	12.685 12.683	559.36 559.28	559.22 559.23	•03 •01	15.7660 22.6120	15.8760 22.6495	69 17
24	990	1.000	283.484	12.681	559.21	559.21	00	28.4990	28.4958	•01
24	992	1.000	294.455	12.679	559.11	559.13	00	37.3690	37.3553	•04
24	993	1.000	247.621	12.742	561.87	561.45	•08	•2571	•5525	-53.47
24	994	1.000	247.734	12.742	561.87	561.45	.08	•3546	•6493	-45.39
24	995	1.000	248.490	12.742	561.87	561.46	.07	1.0065	1.2965	-22.37
24	996	1.000	248.673	12.741	561.86	561.46	•07	1.1642	1.4460	-19.49
24 24	997 998	1.000	249.310 250.333	12.741 12.741	561 •86 561 •85	561 • 47 561 • 48	•07 •07	1.71 <i>3</i> 0 2.5934	1.9909 2.8580	-13.96 -9.26
24	999	1.000	251.088	12.741	561.84	561 • 49	•06	3.2424	3.4955	-7.24
24	1000	1.000	252.974	12.740	561.82	561.51	•06	4.8612	5.0893	-4.48
24	1001	1.000	255.995	12.740	561.79	561.53	•05	7.4466	7.6374	-2.50
24	1002	1 -000	258.548	12.739	561.77	561.55	•04	9.6241	9.7889	-1.68
24	1003	1.000	263.440	12.738	561.72	561.58	•02	13.7810	13.8879	77
24 24	1 0 0 4 1 0 0 5	1.000	268 • 197 273 • 360	12.737 12.736	561.68 561.63	561.59 561.60	•02 •01	17.7930 22.1250	17.8629 22.1530	39 13
24	1005	1.000	278.376	12.735	561.58	561.59	00	26.3070	26.3014	•02
24	1007	1.000	283.231	12.734	561.53	561.57	01	30.3300	30.2986	•10
24	1008	1.000	288.691	12.733	561.48	561.53	01	34.8260	34.7805	.13
24	1009	1.000	293.107	12.732	561.44	561 • 49	01	38.4390	38.3917	•12
24	1010	1.000	297.847	12.731	561.40	561.44	01	42.2950	42.2569	•09
24	1011	1.000	247.820	12.773	563.26	563.03	•04	1.5453	1.7064 2.4196	-9.44 -6.54
24 24	1012 1013	1.000	248.646 250.345	12.773 12.773	563.26 563.24	563.04 563.05	•04 •03	2.2614 3.7322	3.8702	-3.57
24	1014	1.000	252.131	12.772	563.22	563.06	•03	5.2754	5.3930	-2.18
24	1015	1.000	254.247	12.772	563.20	563.07	•02	7.0999	7.1962	-1.34
24	1016	1.000	256.785	12.771	563.18	563.08	• 02	9.2827	9.3570	79
24	1017	1.000	259.619	12.771	563.15	563.09	•01	11.7130	11.7576	38
24	1018	1.000	262.510	12.770	563.12	563.10	•00 -•00	14.1840	14.2002	11 .07
24 24	1019 1020	1.000	265 • 495 268 • 171	12.769 12.769	563.09 563.07	563.10 563.11	01	16.7280 19.0010	16.7160 18.9711	•16
24	1021	1.000	271 • 181	12.768	563.04	563.11	01	21.5500	21.4952	•25
24	1022	1.000	276.240	12.767	562.99	563.10	02	25.8150	25.7229	•36
24	1023	1.000	281.440	12.766	562.94	563.08	02	30.1730	30.0506	•41
24	1024	1.000	286.945	12.765	562.89	563.05	03	34.7600	34.6146	•42
24 24	1025 1026	1 • 000 1 • 000	286.968 291.062	12.765 12.764	562.89 562.85	563.05 563.02	03 03	34.7790 38.1720	34.6338 38.0122	•42 •42
24	1027	1.000	296.653	12.763	562.80	562.97	 03	42.7790	42.6127	•39
24	1028	1.000	235.542	13.073	576.47	576.24	•04	•4570	•6449	-29.13
24	1029	1.000	236.163	13.072	576.46	576.25	•04	1.0563	1.2257	-13.82
24	1030	1.000	237.116	13.072	576.45	576.27	•03	1.9745	2.1205	-6.89
24	1031	1.000	237.986	13.072	576.44	576.29	•03	2.8112	2.9358	-4.24
24 24	1032 1033	1.000	239.626 242.193	13.072 13.071	576.43 576.40	576.32 576.36	•02 •01	4.3844 6.8363	4.4775 6.8728	-2.08 53
24	1034	1.000	245.592	13.070	576.37	576.39	00	10.0630	10.0417	•21
24	1035	1.000	249.203	13.070	576.33	576.42	02	13.4660	13.3880	•58
24	1036	1.000	252.921	13.069	576.29	576.43	02	16.9440	16.8206	•73
24	1037	1.000	256.518	13.068	576.25	576.42	03	20.2830	20.1276	• 77
24	1038	1.000	260.718	13.067	576.21	576.39	03	24.1490	23.9797	•71
24 24	1039 1040	1.000	264 • 442 267 • 990	13.066 13.065	576.17 576.13	576.35 576.29	03 03	27.5490 30.7630	27.3777 30.6017	•63 •53
24	1041	1.000	232.965	13.169	580.70	580.12	•10	1.1792	1.6707	-29.42
24	1042	1.000	234.603	13.168	580.69	580.14	•09	2.7885	3.2595	-14.45
24	1043	1.000	234.672	13.168	580.69	580.14	•09	2.8562	3.3267	-14.14

Table 7. (Continued)

ID	Data Point No.	Weight	Temp.	Den: exp	nt i	Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
1D 24 24 24 24 24 24 24 24 24 24 24 24 24	Point	Weight 1.000	K 236 · 343 238 · 154 239 · 793 242 · 380 245 · 001 249 · 556 254 · 065 258 · 913 263 · 566 268 · 618 273 · 058 226 · 866 228 · 670 230 · 980 234 · 058 237 · 362 242 · 108 247 · 394 250 · 151 254 · 663 258 · 294 261 · 963 265 · 574 218 · 855 219 · 585 221 · 230 223 · 680 226 · 125 227 · 750 228 · 861 229 · 601 231 · 940 234 · 664 238 · 083 242 · 385 246 · 702 251 · 325 256 · 596 211 · 641 217 · 902 222 · 089 225 · 450 2231 235 · 520	ex		Density calc kg/m3 580.16 580.18 580.19 580.22 580.23 580.26 580.26 580.26 580.26 580.27 580.18 587.05 587.05 587.05 587.09 587.12 587.19 587.22 587.23 587.22 587.23 587.22 587.23 587.22 587.23 587.25 587.29 587.29 587.29 587.20 587.21 587.29 587.21 587.29 587.21 587.29 587.23 587.23 587.29 587.23 587.23 587.23 587.25 587.21 587.29 587.21 587.29 587.21 587.29 587.21 587.21 587.29 587.21 587.29 587.21 587.21 587.29 587.21 587.21 587.29 587.23 587.29 587.20 587.21 587.21 587.21 587.21 587.21 587.23 587.23 587.25 587.21 587.21 587.21 587.21 587.21 587.21 587.23 587	Diff.	Pexpt MPa 4.4938 6.2641 7.8622 10.3770 12.9150 17.3020 21.6150 26.2210 30.6100 35.3390 39.4660 1.1092 2.9726 5.3514 8.5084 11.8810 16.6960 22.0190 24.7790 29.2690 32.8600 36.4690 40.0010 -7779 1.5821 3.3908 6.0763 8.7463 10.5150 11.7220 12.5250 15.0560 17.9930 21.6610 26.2480 30.8200 35.6820 41.1820 -4075 1.6320 35.6820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820 -4075 1.6320 35.66820 41.1820		Diff.
			235.520 241.297 244.776 247.542 205.755 207.297 209.435 212.526 216.578 220.157 225.334							

Table 7. (Continued)

G1	Data Point	Weight	Temp.	ex	sity ot ka/m ³	Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff.
24 24 24 24 24 24 24 24 24 24 24 24 24 2	Point No. 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147	1.000 1.000	X 227.547 230.819 235.224 237.320 199.157 200.472 202.817 206.391 210.980 216.347 216.464 221.205 225.885 231.094 192.615 193.111 195.904 197.140 199.390 202.609 205.926 209.500 213.137 215.014 217.285 220.119 184.715 185.973 187.723 189.954 194.865 198.151 204.051 208.548 213.735 177.351 179.819 181.543 183.330 187.888 190.854 194.795 198.915 201.433 204.618 166.227 167.461 168.747	mol/L 13.851 13.850 13.848 13.991 13.990 13.989 13.986 13.985 13.984 13.983	kg/m³ 610.78 610.78 610.73 610.68 610.65 616.96 616.91 616.80 616.73 616.66 616.60 -616.53 624.19 624.19 624.15 624.10 624.05 624.01 623.96 623.91 623.88 623.81 632.32 632.30	calcakg/m3 611.28 611.29 611.30 611.30 611.30 617.01 617.04 617.08 617.16 617.29 617.29 617.26 617.32 624.28 624.29 624.36 624.39 624.44 624.50 624.64 624.65 624.67 624.68 632.36 632.40 631.97 632.49 632.66 632.75 632.79 632.82 640.67 640.71 640.81 640.87 640.94 640.99 641.01 651.65	Diff. 08091011010203050709090712130102030405070910121314000105040508111314010304050811131401030405080101030405080101030405080101030405080911131401030405	MPa 28.0520 31.9060 37.0550 39.4890 .5378 2.2353 5.2383 9.7993 15.6020 22.3260 22.4300 28.0310 34.0430 40.3660 .9162 1.5904 5.3735 7.0407 10.0650 14.3660 18.7680 23.4770 28.2320 30.6720 33.6100 37.2570 .6163 2.4300 4.2992 8.1375 15.1110 19.7350 27.9550 34.1470 41.2140 1.3550 5.1280 7.7509 10.4590 17.3130 21.7350 27.5610 33.5930 37.2500 41.8440 .7033 2.7642 4.9045	MPa 27.4169 31.1770 36.2358 38.6247 .4838 2.1178 5.0287 9.4371 15.0640 21.5934 21.7241 27.4494 33.0622 39.2628 .8001 1.4585 5.1041 6.7082 9.6273 13.7738 18.0378 22.5969 27.2110 29.5762 32.4378 35.9917 .5835 2.3255 4.7519 7.8130 14.5290 18.9841 26.9183 32.9261 39.7878 1.2502 4.8634 7.3727 9.9802 16.5602 20.8033 26.4145 32.2424 35.7785 40.2308 .7554 2.7174 4.7569	2.32 2.34 2.26 2.24 11.16 5.55 4.17 3.84 3.57 3.25 2.12 2.97 2.81 14.52 9.05 5.89 3.75 3.71 3.61 3.52 5.63 4.96 4.55 4.30 4.05 3.89 3.75 3.71 3.52 5.63 4.96 4.15 4.01 3.88 4.15 4.01 4.01 4.01 4.01 4.01 4.01 4.01 4.01

Table 7. (Continued)

ID	Data	Weight	Temp.		sity	Density	Density	Pexpt	Pcalc	Pressure
	No.		K	mol/L	kg/m ³	kg/m ³	Diff.	MPa	MPa	Diff.
555555555555555555555555555555555555555	Point No. 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204	1.000 1.000	K 310.928	040 054 082 111 140 170 232 297 386 481 10.710 10.782 10.830 10.885 10.937 11.032 11.121 11.224 11.326 11.400 11.493 11.557 11.648 11.734 11.783 11.942 12.050 12.145 12.257 12.635 12.778 12.906 13.058 038 051 078 105 1078	1.75 2.40 3.63 4.89 6.18 7.49 10.23 13.12 17.00 21.22 475.48 477.57 480.01 482.30 486.46 490.41 494.96 499.44 502.69 506.79 509.64 513.63 517.45 519.59 526.62 531.35 517.45 519.50 557.16 563.50 559.10 557.16 563.50 569.10 575.82 7.04 9.57 12.21 15.82 7.04 9.57 12.21 15.82 7.04 9.57 12.21 15.68 19.38 27.72 441.76 446.03 449.71 453.13 464.69	calcakg/m3 1.76 2.40 3.64 4.91 6.20 7.52 10.26 13.15 17.01 21.21 471.25 474.03 476.65 479.14 481.51 485.95 490.05 494.77 499.13 503.18 506.98 510.55 513.93 517.14 520.19 525.92 531.19 536.10 540.69 549.08 556.64 563.53 569.87 575.76 1.66 2.28 3.44 4.63 5.84 7.07 9.61 12.25 19.42 27.67 444.77 448.61 458.51 464.14	Diff. 293236394040372805 .04 .22 .31 .19 .18 .16 .10 .07 .04 .0610041806 .0103 .18 .090113 .01273034363838373436383837342916 .20 .27 .28 .25 .21 .12			01ff. 29 .32 .35 .37 .38 .37 .34 .25 .04 -15.61 -15.41 -8.32 -6.70 -5.41 -2.90 -1.8381 -1.23 1.80 .62 2.98 .9089 1.70 -1.8139 1.22 .43 -2.10 -1.04 .06 1.4112 .27 .30 .33 .35 .36 .36 .35 .31 .25 .1415 -8.37 -7.36 -5.73 -4.60 -3.38 -2.01
5 5 5 5	1205 1206 1207 1208	1.000 1.000 1.000	327.594 327.594 327.594 327.594	10.675 10.805 10.905 11.015	470.73 476.46 480.88 485.72	470.42 476.05 481.16 485.86	.06 .09 06 03	8.6184 10.3421 12.0658 13.7895	8.7062 10.4741 11.9649 13.7346	-1.01 -1.26 .84 .40
9	1209	1.000	327.594	11.106	489.75	490.22	10	15.5132	15.3191	1.27

Table 7. (Continued)

ID	Data Point No.	Weight	Temp.	Dens exp mol/L	sity ot kg/m ³	Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff. %
555555555555555555555555555555555555555		1.000 1.000	X 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 327 • 594 324 • 261 349 • 28 360 • 928 360 • 928 360 • 928 360 • 928 360 • 928 360 • 928 360 • 928 360 • 928 360 • 928		kg/m³ 494.41 498.30 502.18 508.54 514.25 518.94 525.02 535.77 543.04 550.12 556.64 564.67 1.58 2.15 3.25 4.37 5.50 6.65 9.01 11.45 14.63 17.98 25.25 43.47 403.09 409.78 415.98 425.92 434.21 4451.08 457.48 463.92 434.24 447.49 503.02 509.37 521.13 529.56 5374.39 503.02 509.37 521.13 529.56 537.18 551.99 1.50 2.05 3.09 4.15.26 6.31 550.80	494.29 498.11 501.71 508.38 514.44 520.01 525.18 534.54 542.87 550.39 557.27 563.61 1.58 2.16 3.26 4.38 5.52 6.68 9.04 11.49 14.67 18.01 25.24 43.09 401.57 409.21 415.57 425.98 434.43 443.28 443.28 450.83 457.47 463.40 468.80 473.75 519.97 529.12 537.32 544.77 5519.97 529.12 537.32 544.77 5519.97 529.12 537.32 544.77 5519.97 529.12 537.32 544.77 5519.97 529.12 537.32 544.77 5519.97 529.12 537.32 544.77 5519.97 529.12 537.32 544.77 5519.97 529.12		MPa 17.2369 18.9606 20.6843 24.1316 27.5790 31.0264 34.4738 41.3685 48.2633 55.1581 62.0528 68.9476 .1013 .1379 .2068 .2758 .3447 .4137 .5516 .6895 .8618 1.0342 1.3790 2.0684 2.7579 3.4474 4.1369 5.5158 6.8948 8.6184 10.3421 12.0658 13.7895 15.5132 17.2369 18.9606 20.6843 24.1316 20.6843 24.1316 20.6843 24.1316 20.6843 24.1316 20.6843 24.1316 20.6858 13.7895 15.5132 17.2369 18.9606 20.6843 24.1316 20.5883 55.1581 62.0528 68.9476 .1013 .1379 .2068 .2758 .3447 .4137 .5516 .6895	MPa 17.2911 19.0484 20.9163 24.2238 27.4680 30.3412 34.3580 42.3382 48.4170 54.8964 61.3997 70.1477 .1011 .1375 .2062 .2749 .3436 .4124 .5499 .6875 .8600 1.0327 1.3797 2.0808 2.8840 3.5050 4.1854 5.5081 6.8609 8.5919 10.4033 12.0709 13.9481 15.6926 17.4537 19.3754 20.6707 24.5468 27.6366 30.6261 34.3674 42.1990 48.6126 55.0349 61.6206 69.3690 .1011 .1375 .2062 .2750 .3437 .4124 .5500 .6876	
5 5	1264 1265	1.000	360.928 360.928	•312 •381	13.75 16.82	13.78 16.84	24 16	.8618 1.0342	.8600 1.0327	•22 •15

Table 7. (Continued)

Table 7. (Continued)

		,								
IĐ	Data	Weight	Temp.	Dens	sity	Density	Density	Pexnt	Pcalc	Pressure
	Point			ex	ot 3	calcz	Diff.			Diff.
	No.		K	mol/L	kg/m ²	kg/m²	%	MPa	MPa	%
D 555555555555555555555555555555555555		1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	K 377.594 377.594 410.928		\$19.43 519.43 527.81 1.32 1.79 2.70 3.62 4.54 5.47 7.36 9.28 11.73 14.23 19.42 30.61 43.12 57.36 73.87 118.19 186.43 267.38 311.35 336.26 355.93 369.60 381.77 391.96 399.68 414.37 426.62 436.19 445.98 462.49	calc kg/m ³ 520.14 527.98 1.32 1.80 2.71 3.63 4.55 5.49 7.38 9.30 11.75 14.25 19.43 30.57 42.96 57.01 73.34 117.42 185.07 263.65 308.51 335.49 354.40 368.97 380.86 390.93 399.69 414.45 426.66 437.12 446.30 461.91	Diff. 14032022252626262524201707153760716673 1-41922343172426000201210713	Pexpt MPa 62.0528 68.9476 .1013 .1379 .2068 .2758 .3447 .4137 .5516 .6895 .8618 1.0342 1.3790 2.0684 2.7579 3.4474 4.1369 5.5158 6.8948 8.6184 10.3421 12.0658 13.7895 15.5132 17.2369 18.9606 20.6843 24.1316 27.5790 31.0264 34.4738 41.3685 48.2633	Pcalc MPa 61.4565 68.7931 .1011 .1376 .2063 .2751 .3438 .4126 .5503 .6879 .8602 1.0326 1.3781 2.0710 2.7662 3.4631 4.1571 5.5351 6.9197 8.7279 10.4918 12.1259 13.9524 15.5964 17.3822 19.1524 20.6826 24.1109 27.5675 30.7001 34.3496 41.6517 48.4397	.97 .22 .20 .21 .25 .26 .26 .26 .26 .27 .19 .10 .10 .13 .30 .45 .49 .35 .36 -1.25 -1.43 30 -1.17 53 -1.43 -1.00 .01 .01 .09 .01
555555555	1349 1350 1351 1352 1353 1354 1355 1356 1357	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	410.928 410.928 410.928 410.928 410.928 410.928 410.928 410.928 410.928	9.397 9.675 9.892 10.114 10.488 10.778 11.032 11.249 11.470	414.37 426.62 436.19 445.98 462.49 475.26 486.48 496.06 505.81	414.45 426.66 437.12 446.30 461.91 474.96 486.21 496.14 505.05	02 01 21 07 .13 .06 .05 02	24.1316 27.5790 31.0264 34.4738 41.3685 48.2633 55.1581 62.0528 68.9476	24.1109 27.5675 30.7001 34.3496 41.6517 48.4397 55.3331 61.9966 69.5758	.09 .04 1.06 .36 68 36 32 .09
5555555555555555555555	1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1370 1371 1372 1373 1374 1375 1376	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261 444.261	.028 .038 .057 .076 .095 .114 .153 .243 .294 .399 .620 .857 1.115 1.395 2.040 2.816 3.956 5.069 5.915	1.22 1.66 2.49 3.33 4.18 5.03 6.76 8.50 10.71 12.96 17.58 27.32 37.81 49.16 61.51 89.55 124.20 174.44 223.54 260.84	1.22 1.66 2.50 3.34 4.19 5.05 6.77 8.52 10.73 12.99 17.60 27.30 37.70 48.93 61.13 89.27 123.71 174.26 222.19 260.34	1820242525262524211809 .10 .29 .48 .61 .76 .39 .10 .61 .19	•1013 •1379 •2068 •2758 •3447 •4137 •5516 •6895 •8618 1•0342 1•3790 2•0684 2•7579 3•4474 4•1369 5•5158 6•8948 8•6184 10•3421 12•0658	•1011 •1376 •2064 •2751 •3439 •4126 •5503 •6879 •8601 1.0325 1.3778 2.0702 2.7649 3.4611 4.1571 5.5460 6.9124 8.6244 10.3962 12.0919	.18 .20 .23 .24 .25 .25 .24 .23 .20 .17 .08 09 25 40 49 54 25 07

Table 7. (Continued)

5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 1 5 1 1 1 5 1 1 1 5 1	1379 1. 1380 1. 1381 1. 1382 1. 1383 1. 1384 1. 1385 1. 1386 1. 1387 1. 1388 1. 1389 1.	000 444.26 000 444.26 000 444.26 000 444.26 000 444.26 000 444.26 000 444.26 000 444.26 000 444.26	1 7.106 1 7.471 1 7.803 1 8.061 1 8.514 1 8.856 1 9.141 1 9.407 1 9.854	291 • 20 313 • 35 329 • 44 344 • 09 355 • 48 375 • 44 390 • 54 403 • 11 414 • 81	289.35 311.52 329.04 343.37 355.47 375.12 390.77 403.81	.64 .59 .12 .21 .00 .08	13.7895 15.5132 17.2369 18.9606 20.6843 24.1316 27.5790	13.9169 15.6761 17.2809 19.0553 20.6865 24.1949	92 -1.04 25 50 01 26
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1392 1. 1393 1. 1394 1. 1395 1. 1396 1. 1397 1. 1398 1. 1399 1. 1400 1. 1401 1. 1402 1. 1403 1. 1404 1. 1405 1. 1406 1. 1407 1. 1408 1. 1409 1. 1410 1. 1411 1. 1412 1. 1413 1. 1414 1. 1415 1. 1417 1. 1418 1. 1417 1. 1418 1. 1419 1. 1419 1. 1420 1. 1421 1. 1422 1. 1423 1. 1424 1. 1425 1. 1426 1. 1427 1.	.000 444.26 .000 444.26 .000 477.59 .000 <td>1 10.481 1 10.724 1 10.975 4 026 4 035 4 052 4 070 4 088 4 106 4 142 4 178 4 224 4 270 4 270 4 365 4 270 4 1.221 1 1.724 2 2.284 4 3.058 3 .864 4 4.636 5 .318 4 6.381 6 .381 6 .385 6 .385</td> <td>434.53 449.55 462.20 472.90 483.96 1.13 1.54 2.31 3.09 3.88 4.66 6.25 7.85 9.87 11.92 16.10 24.80 33.96 43.64 53.83 76.01 100.74 134.83 170.39 204.43 234.49 259.32 281.39 298.73 312.67 337.45 356.14 371.14 384.89 407.79</td> <td>415.00 433.61 448.81 461.70 472.94 482.92 1.13 1.54 2.32 3.10 3.89 4.67 6.26 7.87 9.90 11.95 16.13 24.79 33.89 43.47 53.56 75.55 100.22 134.68 170.81 204.66 234.00 258.88 279.81 297.44 312.46 336.75 355.83 371.46 336.75 355.83 371.46 336.75</td> <td>1705 .21 .17 .1101 .22171922242525252525252115 .03 .21 .40 .49 .62 .51 .112411 .21 .17 .57 .43 .07 .21 .0909 .05 .36</td> <td>31.0264 34.4738 41.3685 48.2633 55.1581 62.0528 68.9476 .1013 .1379 .2068 .2758 .3447 .4137 .5516 .6895 .8618 1.0342 1.3790 2.0684 2.7579 3.4474 4.1369 5.5158 6.8948 8.6184 10.3421 12.0658 13.7895 15.5132 17.2369 18.9606 20.6843 24.1316 27.5790 31.0264 34.4738 41.3685 48.2633 55.1581 62.0528 68.9476 .1013 .1379 .2068</td> <td>27.5233 30.8279 34.4100 41.7488 48.6333 55.4449 62.0301 69.7098 .1012 .1376 .2064 .2751 .3439 .4127 .5502 .6878 .8600 1.0321 1.3770 2.0690 2.7631 3.4595 4.1544 5.5433 6.9220 8.6258 10.3220 12.0535 13.8211 15.5464 17.3807 19.0983 20.7106 24.2444 27.6426 30.9486 34.5272 41.9010 48.7981 55.7155 62.4160 69.9727 .1012 .1376 .2064</td> <td>.20 .64 .19 91 76 52 .04 -1.09 .17 .19 .22 .24 .25 .25 .25 .25 .24 .22 .21 .14 03 19 35 42 50 39 08 .20 .21 83 72 13 21 83 72 13 25 25 25 25 25 25 25 25</td>	1 10.481 1 10.724 1 10.975 4 026 4 035 4 052 4 070 4 088 4 106 4 142 4 178 4 224 4 270 4 270 4 365 4 270 4 1.221 1 1.724 2 2.284 4 3.058 3 .864 4 4.636 5 .318 4 6.381 6 .381 6 .385 6 .385	434.53 449.55 462.20 472.90 483.96 1.13 1.54 2.31 3.09 3.88 4.66 6.25 7.85 9.87 11.92 16.10 24.80 33.96 43.64 53.83 76.01 100.74 134.83 170.39 204.43 234.49 259.32 281.39 298.73 312.67 337.45 356.14 371.14 384.89 407.79	415.00 433.61 448.81 461.70 472.94 482.92 1.13 1.54 2.32 3.10 3.89 4.67 6.26 7.87 9.90 11.95 16.13 24.79 33.89 43.47 53.56 75.55 100.22 134.68 170.81 204.66 234.00 258.88 279.81 297.44 312.46 336.75 355.83 371.46 336.75 355.83 371.46 336.75	1705 .21 .17 .1101 .22171922242525252525252115 .03 .21 .40 .49 .62 .51 .112411 .21 .17 .57 .43 .07 .21 .0909 .05 .36	31.0264 34.4738 41.3685 48.2633 55.1581 62.0528 68.9476 .1013 .1379 .2068 .2758 .3447 .4137 .5516 .6895 .8618 1.0342 1.3790 2.0684 2.7579 3.4474 4.1369 5.5158 6.8948 8.6184 10.3421 12.0658 13.7895 15.5132 17.2369 18.9606 20.6843 24.1316 27.5790 31.0264 34.4738 41.3685 48.2633 55.1581 62.0528 68.9476 .1013 .1379 .2068	27.5233 30.8279 34.4100 41.7488 48.6333 55.4449 62.0301 69.7098 .1012 .1376 .2064 .2751 .3439 .4127 .5502 .6878 .8600 1.0321 1.3770 2.0690 2.7631 3.4595 4.1544 5.5433 6.9220 8.6258 10.3220 12.0535 13.8211 15.5464 17.3807 19.0983 20.7106 24.2444 27.6426 30.9486 34.5272 41.9010 48.7981 55.7155 62.4160 69.9727 .1012 .1376 .2064	.20 .64 .19 91 76 52 .04 -1.09 .17 .19 .22 .24 .25 .25 .25 .25 .24 .22 .21 .14 03 19 35 42 50 39 08 .20 .21 83 72 13 21 83 72 13 25 25 25 25 25 25 25 25
5 14	1430 1.	000 510.92 000 510.92 000 510.92	8 •082	2.88 3.61 4.34	2.89 3.62 4.36	24 25 26	•2758 •3447 •4137	•2751 •3439 •4126	•23 •25 •26

Table 7. (Continued)

ID	Data Point No•	Weight	Temp.	Dens exp mol/L	sity ot kg/m ³	Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff.
5	1434	1.000	510.928	•208	9.16	9.19	26	•8618	.8597	•25
5	1435	1.000	510.928	•251	11.05	11.08	26	1.0342	1.0316	•25
5	1436	1.000	510.928	•337	14.83	14.91	22	1.3790	1.3761	•21
5	1437	1.000	510.928	•516	22.76	22.78	10	2.0684	2.0665	•09
5	1438	1.000	510.928	•702	30.95	30.94	•04	2.7579	2.7589	04
5	1439	1.000	510.928	.895	39.46	39.39	•19	3.4474	3.4534	17
5	1440	1.000	510.928	1.095	48.29	48.15	•30	4.1369	4.1480	27
5	1441	1.000	510.928	1.519	66.98	66.67	•47	5.5158	5.5383	41
5	1442	1.000	510.928	1.973	86.99	86.59	•46	6.8948	6.9212	38
5	1443	1.000	510.928	2.578	113.67	113.38	•25	8.6184	8.6364	21
5	1444	1.000	510.928	3.253	143.69	141.47	1.57	10.3421	10.4773	-1.29
5	1445	1.000	510.928	3.852	169.87	169.35	•31	12.0658	12.0988	27
5	1446	1.000	510.928	4.413	194.61	195.44	43	13.7895	13.7320	•42
5	1447	1.000	510.928	4.951	218.31	218.91	27	15.5132	15.4668	•30
5	1448	1.000	510.928	5.431	239.49	239.72	10	17.2369	17.2163	•12
5	1449	1.000	510.928	5.865	258.62	258.12	•19	18.9606	19.0108	26
5	1450	1.000	510.928	6.223	274.41	274.36	• 02	20.6843	20.6903	03
5	1451	1.000	510.928	6.845	301.86	301.48	•13	24.1316	24.1857	22
5	1452	1.000	510.928	7.331	323.28	323.17	• 04	27.5790	27.6000	08
5	1453	1.000	510.928	7.725	340.65	340.99	10	31.0264	30.9551	•23
5	1454	1.000	510.928	8.076	356.13	356.03	.03	34.4738	34.4973	07
5	1455	1.000	510.928	8.650	381.45	380.42	•27	41.3685	41.7036	80
5	1456	1.000	510.928	9.095	401.06	399.76	•33	48.2633	48.7816	-1.06
5	1457	1.000	510.928	9.462	417.27	415.80	•35	55.1581	55.8480	-1.24
5	1458	1.000	510.928	9.771	430.87	429.53	•31	62.0528	62.7765	-1.15
5	1459	1.000	510.928	10.054	443.36	441.55	•41	69.9476	70.0614	-1.59

Table 7. (Continued)

Table 7. (Continued)

		,								
1D	Data	Weight	Temp.	Den:	sity	Density	Density	Pexpt	Pcalc	Pressure
	Point			ex	o†	calc_ kg/m ³	Diff.			Diff.
	No •		K	mol/L	kg/m ³	kg/m ²	8	MPa	MPa	8
<i></i> 4	4546	1 000	000 450	14 477	400.05	100 11	0.0	4 0700	4 0050	40.07
51	1516	1.000	298.150	11.177	492.85	492.44	•08	1.0729	1.2050	-10.97
51	1517	1.000	298 • 150	11.181	493.05	492.85	.04	1.2035	1.2670	-5.01
51	1518	1.000	298.150	11.182	493.08	492.79	•06	1.1851	1.2777	-7.24
51	1519	1.000	298 • 150	11.188	493.35	493.10	•05	1.2823	1.3632	-5.93
51	1520	1.000	298.150	11.194	493.64	493.30	. 07	1.3494	1 - 4601	-7.58
51	1521	1.000	298 - 150	11.194	493.64	493.32	•07	1.3546	1.4601	-7.23
51	1522	1.000	298.150	11.249	496.03	495.77	•05	2.1679	2.2565	-3.92
51	1523	1.000	298 • 150	11.302	498.39	498.14	•05	2.9922	3.0789	-2.81
51	1524	1.000	298.150	11.423	503.71	503.50	•04	4.9970	5.0808	-1.65
51	1525	1.000	298 • 150	11.500	507.12	507.01	•02	6.4183	6.4669	75
51	1526	1.000	298.150	11.523	508.14	508.00	•03	6.8399	6.8973	~.83
51	1527	1.000	298.150	11.592	511.19	511.15	•01	8.2207	8.2388	22
51	1528	1.000	298.150	11.679	515.00	515.00	00	10.0107	10.0092	•01
51	1529	1.000	303.150	10.984	484.35	484.11	•05	1.1011	1.1670	-5.65
51	1530	1.000	303.150	10.989	484.59	484.40	• 04	1.1832	1 - 2373	-4.38
51	1531	1.000	303.150 303.150	10.995	484.85	484.68	•04 •03	1.2631	1.3127	-3. 79
51	1532	1.000		11.001	485.11 485.38	484.97		1.3466	1.3871	-2.92
51 51	1533 1534	1.000	303.150 303.150	11.007 11.008	485.42	485 • 24 485 • 12	•03 •06	1.4248	1 • 4666 1 • 4775	-2.85
51	1535	1.000	303.150	11.020	485.96		•06	1.5488	1.6367	- 5.87
51	1536	1.000	303.150	11.110	489.91	485.66 489.82	•00	2.8254	2.8568	-5.37 -1.10
51	1537	1.000	303.150	11.252	496.17	496.03	•03	4.9364	4.9861	-1.00
51	1538	1.000	303.150	11.353	500 • 65	500.58	•01	6.6466	6.6743	 41
51	1539	1.000	303.150	11.441	504.50	504.51	00	8.2408	8.2386	•03
51	1540	1.000	303.150	11.527	508.31	508.41	02	9.9332	9.8890	•45
52	1541	1.000	303.150	10.983	484.33	484.24	•02	1: 1376	1.1624	-2.13
52	1542	1.000	303.150	10.989	484.60	484.55	•01	1.2252	1.2404	-1.22
52	1543	1.000	303.150	10.996	484.87	484.84	•01	1.3081	1.3189	82
52	1544	1.000	303.150	11.007	485.40	485.36	•01	1.4614	1.4713	67
52	1545	1.000	303.150	11.015	485.73	485.65	•02	1.5460	1.5687	-1 . 45
52	1546	1.000	303.150	11.137	491.10	491.07	•01	3.2314	3.2407	29
52	1547	1.000	303.150	11.180	492.99	492.94	•01	3.8543	3.8736	50
52	1548	1.000	303.150	11.260	496.52	496.54	00	5.1231	5.1157	•15
52	1549	1.000	303.150	11.302	498.38	498.45	01	5.8301	5.8027	•47
52	1550	1.000	303.150	11.362	501.05	501.03	•00	6.8244	6.8309	10
52	1551	1.000	303.150	11.537	508.77	508.96	04	10.1807	10.0949	•85
51	1552	1.000	313.150	10.596	467.27	467.38	02	1.4533	1.4281	1.77
51	1553	1.000	313.150	10.602	467.54	467.65	02	1.5149	1.4892	1.72
51	1554	1.000	313.150	10.609	467.81	467.92	02	1.5776	1.5520	1.65
51	1555	1.000	313.150	10.615	468.08	468.17	· - •02	1.6349	1.6152	1.22
51	1556	1.000	313.150	10.621	468.38	468.45	02	1.7015	1 • 6835	1.07
51	1557	1.000	313.150	10.628	468.69	468.60	•02	1.7347	1.7559	-1.20
51	1558	1.000	313.150	10.634	468.91	468.94	01	1.8158	1.8099	• 32
51	1559	1.000	323.150	.800	35.28	35.39	 33	1.6127	1.6091	•22
51	1560	1.000		.820	36.16		37	1.6402	1 • 6361	•25
51	1561	1.000	323.150	.840	37.04	37.19	40	1.6668	1.6625	•26
51	1562	1.000	323.150	. 850	37.48	37.64	41	1.6799	1.6754	•27
51	1563	1.000	323.150	.860	37.92	38.08	42	1.6928	1.6882	•27
51	1564	1.000	323.150	.870	38.36	38.53	43	1.7056	1.7009	•28
51	1565	1.000	323.150	•875	38.59	38.75	42	1.7118	1.7071	•27
51	1566	1.000	323.150	.876		38.76	40	1.7122	1.7078	• 26
51	1567	1.000	323.150	10.179	448.85	448.65	.04	1.7664	1.8014	-1 -94
51	1568	1.000	323.150	10.179	448.85	448.73	.03	1.7807	1.8014	-1.15
51	1569	1.000	323.150	10.179	448.86	448.60	•06	1.7575	1.8038	-2.57
51 51	1570	1.000	323.150	10.185	449.11	449.01	•02	1.8288	1.8473	-1.00 -2.53
51	1571	1.000	323.150	10.185	449.13	448.87	•06	1.8046	1.8513	-2.52

Table 7. (Continued)

ID	Data Point	Weight	Temp.	Den: exp	h	Density calc_	Density Diff.	P _{expt}	Pcalc	Pressure Diff.
	No.		K	mol/L	kg/m ³	kg/m ³	%	MPa	MPa	%
51 51 51 51 51 51 51 51 51 51 51 51 51 5	Point	1.000 1.000	K 323.150 333.150	ex	kg/m ³ 449.17 449.39 449.40 449.65 449.65 449.91 449.93 450.21 450.22 452.00 463.02 474.04 35.28 36.16 37.04 37.48 37.92 38.36 448.99 449.26 449.26 449.27 450.07 462.92 486.58 507.29 529.09 35.28 39.69 44.10 46.30 46.74 47.40 48.51 49.48 47.40 48.51 49.48 427.69 428.19 428.44 428.71 428.71 429.23 429.50	calca kg/m3 448.82 449.16 449.15 449.15 449.70 450.06 449.94 449.87 462.85 473.96 35.40 35.40 36.29 37.19 37.63 38.08 38.53 448.55 448.87 449.18 449.46 449.74 462.85 7507.86 530.13 35.34 39.77 44.22 485.57 530.13 35.34 39.77 44.22 48.70 49.59 49.66 427.51 428.04 428.30 428.33 428.33 429.33	08 .05 .06 .04 .05 .03 .05 .03 .06 .07 .06 .04 .02 .35 .34 .37 .39 .40 .42 .43 .10 .09 .08 .07 .07 .02 .21 .11 .20 .19 .22 .28 .33 .35 .35 .35 .36 .39 .41 .37 .04 .04 .03 .03 .04	MPa 1.7970 1.8570 1.8544 1.9133 1.9083 1.9660 1.9525 2.0171 1.9952 1.9867 2.3253 4.6856 7.6467 1.6129 1.6128 1.6402 1.6668 1.6799 1.6928 1.7056 1.7482 1.8055 1.8597 1.9100 1.9587 4.6788 11.4691 21.2865 35.0469 1.7004 1.8449 1.9755 2.0358 2.0475 2.0646 2.0925 2.1142 2.1158 2.1278 2.1595 2.1955 2.2288 2.2577 2.2961 2.3301 2.3625		-3.32 -2.14 -2.36 -1.55 -1.93 -1.18 -2.11 -1.00 -2.36 -2.89 -2.088530 .24 .23 .25 .26 .26 .27 .28 -4.24 -3.65 -3.25 -2.99 -2.9653 -3.15 1.42 2.18 .13 .14 .18 .20 .21 .21 .21 .22 .23 .21 -1.07978681 -1.028291
51 51	1618 1619	1.000 1.000	333.150 333.150 343.150	9.740 9.746 .800	429.50 429.76 35.28	429.33 429.59 35.31	.04 .04 09	2.3625 2.3966 1.7859	2.3841 2.4185 1.7847	91 91 .07
51 51 51	1619 1620 1621	1.000 1.000 1.000	343.150 343.150 343.150	.800 1.000 1.200	35.28 44.10 52.92	35 • 31 44 • 13 52 • 98	09 07 11	1.7859 2.0890 2.3408	1.7847 2.0881 2.3393	.07 .04 .06
51 51 51	1622 1623 1624 1625	1.000 1.000 1.000	343.150 343.150 343.150 343.150	1.300 1.350 1.400 1.425	57.33 59.53 61.74 62.84	57.43 59.66 61.91 63.04	18 22 28 32	2.4484 2.4977 2.5442 2.5663	2.4461 2.4949 2.5407 2.5625	.09 .11 .14
51 51	1626 1627	0.000 1.000	343.150 343.150	1.448 9.149	63.85 403.44	403.11	-84.16 .02	2.5856 2.6054	2.5818 2.6132	•14 -•30

Table 7. (Continued)

1D	Data Point No.	Weight	Temp∙ K	Dens exp mol/L	sity ot kg/m ³	Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff.
51 51 51 51 51 51 52 52 52 52 52 52 52 52 52 52 52	Point No. 1628 1629 1630 1631 1632 1633 1634 1635 1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	K 343.150	9.155 9.160 9.165 9.171 9.177 9.182 9.188 9.193 1.300 1.450 1.440 1.425 1.448 9.147 9.152 9.158 9.164 9.169 9.175	kg/m ³ 403.69 403.94 404.17 404.42 404.67 404.92 405.15 405.40 57.33 59.53 61.74 62.84 63.85 403.34 403.60 403.84 404.09 404.33 404.59 35.28	calc kg/m ³ 403.58 403.82 404.06 404.32 404.56 404.81 405.03 405.26 57.42 59.66 61.90 63.05 403.11 403.41 403.84 403.89 404.16 404.37 35.30	03 03 03 03 03 03 03 04 -17 -21 -26 -33 -84 16 05 05 05 05 05 06	MPa 2.6247 2.6445 2.6651 2.6868 2.7077 2.7290 2.7479 2.7680 2.4483 2.4976 2.5440 2.5665 2.5856 2.5880 2.6108 2.6294 2.6504 2.6732 2.6914 1.8282	MPa 2 • 6341 2 • 6546 2 • 6746 2 • 6770 2 • 7385 2 • 7589 2 • 7807 2 • 4461 2 • 4949 2 • 5407 2 • 5625 2 • 5818 2 • 6049 2 • 6261 2 • 6462 2 • 6677 2 • 6882 2 • 7100 1 • 8273	3638363234354046 .09 .11 .13 .16 .15655863655669 .05
51 51 51 51 51 51 51 51 51 51 51 51 51 5	1647 1648 1649 1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1660 1661 1662 1663 1664 1665	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150 348.150	1.000 1.400 1.500 1.550 1.600 1.625 1.650 8.829 8.834 8.840 8.844 8.850 8.855 8.865 9.000 9.500	35.28 44.10 61.74 66.15 68.35 70.56 71.66 72.76 389.33 389.57 389.81 390.01 390.25 390.47 390.47 390.94 396.88 418.92 35.28	44.09 61.76 66.21 68.45 70.71 71.84 72.97 389.23 389.46 389.71 389.93 390.16 390.39 390.61 390.84 396.55 418.51 35.30	06 .01 03 10 15 21 25 28 .03 .03 .02 .02 .02 .02 .02 .03 .08	1.8282 2.1447 2.6310 2.7241 2.7666 2.8065 2.8255 2.8438 2.8604 2.8745 2.8907 2.9048 2.9200 2.9348 2.9496 2.9642 3.3770 5.6828 1.8281	1.8273 2.1448 2.6305 2.7227 2.7647 2.8039 2.8225 2.8405 2.8668 2.8815 2.8969 2.9100 2.9257 2.9402 2.9557 2.9713 3.4025 5.7387 1.8273	-01 -02 -05 -07 -09 -11 -12 -23 -24 -21 -18 -20 -18 -21 -24 -75 -98
52 52 52 52 52 52	1666 1667 1668 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679 1680 1681 1682 1683	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	348.150 348.150 348.150 348.150 348.150 348.150 353.150 353.150 353.150 353.150 353.150 353.150 353.150 353.150 353.150 353.150 353.150	9.001 9.501 9.999 10.499 11.000	396.94 418.96 440.91 462.97 485.05 507.11	396.48 418.53 440.79 463.09 485.48 507.89 35.29 44.07 66.07 74.97 79.45 81.72 83.99 373.14 373.35 373.57 373.80 374.00	•12 •10 •03 •03 •09 •15	3.3717 5.6861 9.5096 15.3466 23.8349 35.6945 1.8701 2.2000 2.8177 2.9904 3.0621 3.0945 3.1365 3.1462 3.1561 3.1667 3.1760	3.4076 5.7436 9.5358 15.3066 23.6406 35.2172	-1.05 -1.00 28 .26 .82 1.36

Table 7. (Continued)

10	Data Point	Weight	Temp.	Dens exp	at i	Density calc,	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mol/L	kg/m ³	kg/m ³	8	MPa	MPa	%
51 51 51 51 51 51 51 51 51 51 51 51 51 5	Point No. 1684 1685 1686 1687 1688 1689 1690 1691 1692 1693 1694 1695 1696 1697 1698 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1730 1731	1.000 1.000	K 353.150 353.150 353.150 358.150 358.150 358.150 358.150 358.150 358.150 358.150 358.150 358.150 358.150 363.150	8.486 8.491 8.496 8.000 1.500 1.500 1.500 2.200 2.225 8.025 8.030 8.034 8.039 8.043 8.043 8.052 800 1.500 2.500 2.550 2.6600 2.550 2.6600 2.550 7.466 7.476 7.483 7.500 7.507 2.000 2.550 2.650 7.462 7.466 7.470 800 1.500 2.500 2.500 2.550 2.650 7.462 7.466 7.470 800 1.500 2.500 2.500 2.500 2.500 2.500	89/m³ 374.23 374.44 374.66 35.28 44.10 66.15 83.78 88.19 92.60 97.01 98.12 353.88 354.08 354.28 354.68 354.88 355.08 44.10 66.15 88.19 110.24 112.45 114.65 115.98 116.86 329.29 329.66 330.00 330.71 331.05 88.19 110.24 112.45 114.65 115.98 116.86 329.25 329.25 329.25 329.42 35.28 44.10 66.15 88.19	calc kg/m ³ 374.22 374.44 374.63 355.28 44.05 65.98 83.68 88.16 92.68 97.26 98.42 354.13 354.52 354.70 354.88 355.06 355.25 35.28 43.97 65.91 87.93 110.44 112.74 115.06 116.46 117.39 329.89 330.23 330.85 331.19 331.50 87.92 110.45 112.76 115.08 116.49 117.45 329.50 329.70 329.83 35.28 44.04 65.58 87.87 87.85 110.17 110.10	00 00 00 00 00 00 00 00 00 00 00 00 00	MPa 3.1865 3.1964 3.2056 1.9117 2.2547 2.9101 3.2525 3.3162 3.3717 3.4196 3.4304 3.4408 3.4461 3.4521 3.4521 3.4527 3.4682 3.4738 1.9532 2.3062 3.0010 3.4504 3.7735 3.7787 3.7787 3.77882 3.7787 3.77882 3.7787 3.7787 3.7787 3.77882 3.7735 3.7787 3.77882 3.7735 3.7777	MPa 3.1865 3.1967 3.2072 1.9115 2.2563 2.9141 3.2541 3.3166 3.3708 3.4172 3.4277 3.4336 3.4394 3.4452 3.4509 3.4569 3.4628 3.4688 1.9531 2.3111 3.0071 3.4545 3.7048 3.7210 3.7359 3.7441 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7860 3.7751 3.7787	0001050105010501050105010501030708211920191716150021201204050708082423352019120406070809171816001049150203
51 51 51 51 51 51 51	1 732 1 733 1 734 1 735 1 736 1 737 1 738	1.000 1.000 1.000 1.000 1.000 1.000	365.150 365.150 365.150 365.150 365.150 365.150 365.150	2.700 2.700 2.750 2.750 2.800 2.800 2.850	119.06 119.06 121.27 121.27 123.47 123.47 125.68	119.32 119.22 121.63 121.52 123.95 123.82 126.31	21 13 30 21 39 28 50	3.8456 3.8450 3.8593 3.8587 3.8717 3.8711 3.8831	3.8440 3.8440 3.8572 3.8572 3.8693 3.8693 3.8801	.04 .03 .05 .04 .06 .05
51	1739	1.000	365.150	2.850	125.68	126.16	 38	3.8824	3.8801	•06

Table 7. (Continued)

10	Data Point No•	Weight	Temp∙ K	Dens exp mol/L	+	Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
51 51 51 51 51 51 51 51 51 51 51 51	Point No. 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	K 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150 365.150	2.900 2.900 7.163 7.167 7.170 7.170 7.184 7.184 7.192 7.200 7.200 7.207 7.207 7.207 7.207 7.214 2.500 3.000 3.100	127.88 127.88 127.88 315.86 316.03 316.18 316.80 317.15 317.16 317.48 317.48 317.48 317.80 318.13 110.24 132.29 136.70	calc kg/m ³ 128.63 128.49 316.61 316.82 316.87 317.42 317.76 317.77 318.01 318.06 318.31 318.36 318.36	Diff. % 58 47 24 25 22 20 19 19 17 18 16 17 17 16 36 50	MPa 3.8930 3.8925 3.9065 3.9085 3.9091 3.9090 3.9146 3.9180 3.9182 3.9206 3.9211 3.9237 3.9243 3.9275 3.8498 4.0024 4.0201	MPa 3.8899 3.8899 3.8993 3.9009 3.9023 3.9023 3.9083 3.9118 3.9119 3.9151 3.9151 3.9151 3.9184 3.9185 3.9218 3.8515 4.0004 4.0177	.08 .06 .18 .20 .17 .17 .16 .15 .16 .14 .15 .14 .15 .14
51 51 51 51 51 51 51 51 51 51 51 51	1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773	1.000 1.000 0.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	367.150 367.150 367.150 367.150 367.150 367.150 367.150 368.150 368.150 368.150 368.150 368.150 368.150 368.150 368.150	3.200 3.250 3.270 3.290 6.769 6.772 6.775 6.798 .800 1.000 1.500 2.000 2.500 3.000 3.300 3.350	141.11 143.32 144.20 145.08 298.47 298.62 298.76 299.78 35.28 44.10 66.15 88.19 110.24 132.29 141.11 145.52 147.73	142.08 144.47 298.47 298.89 299.47 299.59 299.73 300.51 35.28 44.03 65.86 87.77 110.00 132.55 141.71 146.35 148.68	6980 -51.69 -51.4633333224 .00 .15 .43 .48 .2220425764	4.0343 4.0403 4.0424 4.0444 4.0473 4.0480 4.0487 4.0529 1.9944 2.3629 3.0910 3.5818 3.8852 4.0478 4.0840 4.0973 4.1029	4.0317 4.0375 4.0396 4.0416 4.0424 4.0431 4.0438 4.0489 1.9944 2.3656 3.0987 3.5892 3.8876 4.0465 4.0820 4.0952 4.1007	.07 .07 .07 .07 .12 .12 .10 00 11 25 21 06 .03 .05 .05
51 51 51 51 51 51 51 51 51 51 51 51 51 5	1775 1776 1777 1778 1779 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791 1792 1793 1794	1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	368.150 368.150 368.150 368.150 368.150 368.150 368.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150	3.400 3.450 3.500 6.499 6.502 6.505 6.508 6.511 2.500 2.500 3.700 3.750 3.750 3.850 3.850 3.920 6.112 6.115 6.118	149.93 152.14 154.34 286.57 286.70 286.84 286.97 287.10 110.24 110.24 132.29 154.34 163.16 165.36 167.57 171.98 172.86 269.54 269.66 269.78	151.03 153.36 155.75 287.68 287.81 287.89 288.04 288.15 109.95 132.41 155.14 164.54 166.47 168.79 171.11 268.91 269.38 270.58 270.61 270.75	73809139383737363127095184677278 -36.05 -35.83393536	4.1079 4.1121 4.1158 4.1199 4.1203 4.1205 4.1210 4.1213 3.9199 3.9204 4.0928 4.1713 4.1857 4.1857 4.1898 4.1915 4.1929 4.1944 4.1947 4.1948 4.1949	4.1056 4.1099 4.1137 4.1166 4.1170 4.1177 4.1181 3.9234 3.9234 4.0922 4.1697 4.1841 4.1866 4.1887 4.1926 4.1921 4.1926 4.1935 4.1937 4.1938	.05 .05 .08 .08 .08 .08 .08 .08 .09 09 08 .02 .04 .04 .03 .02 .02 .02 .02

Table 7. (Continued)

ID	Data Point	Weight	Temp.		sity	Density		Pexpt	Pcalc	Pressure
	No •		K	mo1/L	kg/m ³	kg/m ³	%	MPa	MPa	Z
51 51 51 51 51 51 51 51 51 51 51 51 51 5	Point No. 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839	1.000 1.000	8 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.150 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.650 369.750	ex mo1/L 6.121 6.123 6.129 6.129 6.134 6.139 6.145 6.199 6.251 6.500 3.750 3.800 3.950 3.950 3.950 3.950 4.000 5.733 5.757 5.781 5.781 5.782 5.829 3.950 4.000 4.150 4.100 4.100	269.90 270.02 270.14 270.26 270.26 270.49 270.73 270.97 273.37 275.65 286.63 132.29 143.32 154.34 165.36 167.57 171.98 174.18 176.39 251.49 252.82 253.86 254.90 254.91 255.93 174.18 176.39 178.59 180.80 183.00 185.21 189.62 247.98 247.97 247.98 248.78 249.98 247.97 247.98 248.78 249.98 241.31 253.89 176.39 178.59 180.80 183.00 185.21 189.62 247.28 247.97 247.98 248.78 249.98 241.31 253.89 176.39 176.39 176.39 178.59 180.80 183.00 185.21 189.62 247.98 247.97 247.98 248.78 249.98 241.31 253.89 176.39 176.39	calc kg/m³ 270.78 270.89 271.01 271.02 271.03 271.25 271.42 271.59 273.51 275.36 285.43 132.39 143.67 154.97 166.13 168.32 170.49 177.66 174.99 177.26 252.54 253.38 254.02 254.73 254.88 255.11 255.52 256.33 174.86 177.24 179.03 181.47 183.67 185.37 191.27 245.14 246.22 248.48 249.24 250.27 251.92 177.65 194.98 248.98 248.98	Diff.			01ff. 02 02 02 02 02 02 01 -01 -01 03 03 02 02 02 01 01 01 01 01 00 -00 -00 -00 -00 -01 01 01 01 01 01 01 01 01 01 01 01 01 0
52 52 52 52	1844 1845 1846 1847	1.000 1.000 1.000	369.750 369.750 369.750 369.750 369.770	5.577 5.588 5.633 5.680 4.000	245.91 246.41 248.42 250.46 176.39	249.11 249.11 250.53 251.54 177.70	-1 · 29 -1 · 09 - · 84 - · 43 - · 74	4.2402 4.2406 4.2409 4.2356	4.2397 4.2401 4.2406 4.2348	•01 •01 •02
52 52 52 52	1848 1849 1850 1851	1.000 1.000 1.000	369.770 369.770 369.770 369.770	4.150 4.200 4.250 4.300	183.00 185.21 187.41 189.62	184.61 186.88 189.21 191.74	87 89 95 -1.11	4.2388 4.2395 4.2400 4.2405	4.2382 4.2390 4.2396 4.2401	.01 .01 .01

Table 7. (Continued)

Œ	Data Point No•	Weight	Temp.	Dens exp mol/L		Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff.
52 52 52 52 52 52 52 52 52 52 52 52 52 5	Point No. 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873	1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	369.770 369.770 369.770 369.770 369.770 369.770 369.770 369.790 369.790 369.790 369.790 369.790 369.790 369.790 369.790 369.790 369.790 369.790 369.790 369.810 369.810 369.810	## mol/L 4.350 4.440 5.544 5.566 5.611 5.655 5.703 4.020 4.221 4.272 4.322 4.372 4.423 4.486 5.519 5.563 5.609 5.654 5.701 4.000 4.200 4.300 4.350	kg/m ³ 191.82 195.79 244.46 245.43 247.42 249.37 251.50 177.29 186.15 188.37 190.59 192.80 195.02 197.83 243.38 245.32 247.32 249.34 251.40 176.39 185.21 189.62 191.82	calc kg/m ³ 194.08 244.56 247.37 248.11 249.12 250.48 251.77 178.58 187.72 188.68 192.14 194.92 196.99 242.23 246.00 247.10 247.93 249.46 251.08 177.64 186.38 191.02 193.07	Diffo -1.16 -19.94 -1.17 -1.08 68 44 11 73 84 16 81 -1.09 -1.00 -18.33 -1.07 72 24 05 .13 71 63 74 64	MPa 4.2408 4.2412 4.2417 4.2418 4.2421 4.2424 4.2428 4.2375 4.2411 4.2420 4.2423 4.2425 4.2428 4.2433 4.2425 4.2436 4.2436 4.2436 4.2445 4.2436 4.2445 4.2382 4.2436	MPa 4 • 2405 4 • 2409 4 • 2412 4 • 2417 4 • 2421 4 • 2427 4 • 2437 4 • 2417 4 • 2421 4 • 2423 4 • 2429 4 • 2431 4 • 2429 4 • 2431 4 • 2436 4 • 2429 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431 4 • 2431	01 ff. % .01 .01 .01 .01 .01 .00 .02 .01 .00 .01 .00 .01 .00 .00 .01 .01 .00 .00
52 52 52 52 52 52 52 52 52 52 52 52 52 5	1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1890 1891 1892 1893 1894 1895 1896 1897	1.000 1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	369.810 369.810 369.810 369.810 369.810 369.810 369.830 369.830 369.830 369.830 369.830 369.830 369.830 369.830 369.830 369.830 369.830 369.830 369.830	4.400 4.450 4.530 5.473 5.517 5.561 5.629 5.699 4.000 4.200 4.300 4.450 4.572 5.351 5.473 5.516 5.666 5.675 4.000 4.200	194.03 196.23 199.76 241.35 243.27 245.24 248.23 251.30 176.39 185.21 189.62 194.03 196.23 198.44 201.61 235.99 241.32 243.25 245.20 247.20 250.24 176.39 185.21	195.65 198.52 241.11 244.37 244.78 246.17 248.18 250.54 177.79 186.45 191.08 195.67 198.10 200.51 236.07 241.27 242.85 243.91 245.77 247.35 249.45 177.61 186.71	83 -1.15 -17.15 -1.246138 -02 -307966768494 -1.04 -14.60 -2.1963272306 -32	4.2439 4.2441 4.2448 4.2449 4.2455 4.2455 4.2455 4.2455 4.2435 4.2447 4.2453 4.2455 4.2457 4.2459 4.2464 4.2465 4.2468 4.2468 4.2472 4.2477 4.2477 4.2477	4.2437 4.2439 4.2442 4.2445 4.2447 4.2455 4.2456 4.2387 4.2451 4.2451 4.2451 4.2459 4.2459 4.2459 4.2457 4.2459 4.2462 4.2467 4.2471 4.2479 4.2393 4.2438	.00 .00 .01 .01 .00 .000001 .02 .01 .01 .00 .00 .00 .00 .00 .00 .00 .00
52 52 52 52 52 52 52 52 52 52 52 52	1898 1899 1900 1901 1902 1903 1904 1905 1906 1907	1.000 1.000 1.000 1.000 0.000 1.000 1.000 1.000 1.000	369.840 369.840 369.840 369.840 369.840 369.840 369.840 369.840 369.840	4.400 4.450 4.500 4.550 4.600 5.300 5.340 5.382 5.450 5.499	194.03 196.23 198.44 200.64 202.85 233.70 235.49 237.32 240.35 242.51	195.96 197.88 199.86 205.97 234.49 240.24 241.12 240.70 241.81 243.66	99 83 71 -2.59 -13.49 -2.72 -2.34 -1.40 60 47	4.2461 4.2463 4.2464 4.2466 4.2467 4.2470 4.2471 4.2471 4.2472 4.2474	4.2458 4.2461 4.2463 4.2464 4.2465 4.2467 4.2467 4.2468 4.2470 4.2472	.01 .00 .00 .00 .00 .01 .01 .01

Table 7. (Continued)

10	Data Point	Weight	Temp.	ex	sity pt ka/m³	Density calc_ kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
52 51 51 51 51 51 51 51 51 52 52 52 52 52 52 52 52 52 52 52 52 52	Point No. 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955	1.000 1.000 1.000 1.000 1.000 0.000 0.000 0.000 1.000	K 369.840 369.850 369.860	5.600 4.000 4.200 4.400 4.600 5.000 5.000 5.000 5.200 5.400 4.500 4.550 4.600 4.750 4.900 5.150 5.100		calc kg/m ³ 246.74 177.04 185.29 193.06 197.69 198.93 199.95 199.20 199.49 228.29 241.74 177.64 186.54 195.62 197.92 200.27 201.99 207.91 233.13 233.93 236.22 236.65 237.78 237.05 239.00 238.72 239.27 242.97 246.01 177.46 183.83 194.48 202.38 216.54 206.69 228.90 223.53 232.66 234.40 238.52 241.76 245.46 177.46 186.08 194.97 203.41 207.20	093704 .50 2.61 6.40 10.27 10.68 14.94 4.31 2.15707182859267 -2.43 -10.15 -7.63 -6.66 -4.97 -4.49 -4.20 -2.21 -1.174818 .38615223 -2.3 -4.29 2.41 -5.60 -1.36 -3.34 -1.442916 .32 .6060474828 .03	MPa 4.2479 4.2404 4.2445 4.2464 4.2470 4.2471 4.2475 4.2480 4.2488 4.2470 4.2472 4.2473 4.2476 4.2476 4.2476 4.2477 4.2477 4.2477 4.2477 4.2477 4.2477 4.2477 4.2478 4.2478 4.2484 4.2480 4.2483 4.2484 4.2484 4.2484 4.2484 4.2484 4.2488 4.2489 4.2489 4.2488 4.2489 4.2481 4.2488 4.2488 4.2488	MPa 4.2480 4.2400 4.2445 4.2466 4.2475 4.2475 4.2475 4.2477 4.2489 4.2400 4.2445 4.2466 4.2473 4.2475 4.2481 4.2482 4.2483 4.2483 4.2483 4.2483 4.2483 4.2483 4.2488 4.2490 4.2498 4.2490 4.2498 4.2490	
52 52	1953 1954	1.000	369.870 369.870	4.400 4.600	194.03 202.85	194.97 203.41	48 28	4.2481 4.2488	4.2480 4.2488	•00

Table 7. (Continued)

ID	Data Point	Weight	Temp.	ext	sity ot 3	Density	Density Diff.	Pexpt	Pcalc	Pressure Diff•
	No.		K	mo1/L	kg/m ³	kg/m ³	%	MPa	MPa	16
52	1964	1.000	369.870	5.600	246.94	245.43	•62	4.2504	4.2507	01
51	1965	1.000	369.900	4.000	176.39	176.78	22	4.2435	4.2432	•01
51	1965	1.000	369.900	4.200	185.21	185.09	.06	4.2479	4.2479	00
51	1967	1.000	369.900	4.560	201.08	195.10	3.07	4.2503	4.2510	01
51	1968	1.000	369.900	4.600	202.85	197.04	2.95	4.2506	4.2511	01
51	1969	1.000	369.900	4.700	207.26	198.86	4.22	4.2508	4.2513	01
51	1970	1.000	369.900	4.800	211.67	198.34	6.72	4.2507	4.2514	02
51	1971	1.000	369.900	4.900	216.08	197.21	9.57	4.2506	4.2514	02
51	1972	1.000	369.900	5.000	220.49	201.63	9.35	4.2510	4.2515	01
51	1973	0.000	369.900	5.100	224.90	199.76	12.58	4.2509	4.2516	02
51	1974	0.000	369.900	5.200	229.31	202.26	13.37	4.2510	4.2517	02
51	1975	1.000	369.900	5.300	233.72	215.53	8.44	4.2514	4.2518	01
51	1976	0.000	369.900	5.400	238.13	207.64	14.68	4.2513	4.2521	02
51	1977	1.000	369.900	5.600	246.94	240.84	2.54	4.2524	4.2535	03
51	1978	1.000	369.900	5.800	255.76	251.63	1.64	4.2549	4.2569	05
51	1979	1.000	370.150	2.500	110.24	109.89	•32	3.9553	3.9591	10
51	1980	1.000	370.150	3.000	132.29	132.30	00	4.1376	4.1376	•00
51	1981	1.000	370.150	3.500	154.34	154.83	31	4.2262	4.2249	•03
51	1982	1.000	370.150	4.000	176.39	176.66	15	4.2596	4.2594	•01
51	1983	1.000	370.150	4.500	198.44	194.87	1.83	4.2683	4.2691	02
51	1984	1.000	370.150	4.750	209.46	201.37	4.02	4.2696	4.2706	02
51	1985	1.000	370.150	5.000	220.49	205.72	7.18	4.2702	4.2718	04
51	1986	1.000	370.150	5.250	231.51	212.74	8.82	4.2710	4.2730	05
51	1987	1.000	370.150	5.500	242.53	227.02	6.83	4.2725	4.2750	06
51	1988	1.000	370.150	6.000	264.58	259.93	1.79	4.2845	4.2898	12

Table 7. (Continued)

ID	Data Point No.	Weight	Temp.	Dens exp mol/L		Density calc kg/m ³	Density Diff.	P _{expt}	P _{calc}	Pressure Diff.
17 17 17 17 17 17 17 17 17 17 17 17 17 1		0.000 0.000			kg/m ³ 452.40 452.29 452.16 460.31 460.09 459.87 468.29 467.90 467.56 476.97 476.36 476.97 476.97 476.36 476.97 476.36 476.97 476.36 476.97 476.37 476.37 476.37 476.37 476.37 476.37 476.37 477 476.37 476.37 476.37 476.37 476	calc kg/m3 451.56 451.41 451.30 459.51 459.27 459.09 467.57 467.21 466.92 476.40 475.79 475.49 483.85 483.42 492.60 492.19 491.74 491.30 500.68 500.39 499.86 499.43 508.21 509.61 507.93 507.93 507.64 516.63 516.52 516.11 515.73 515.42 523.54 523.54 523.54 522.75 522.37				
17 17 17	2026 2027 2028	0.000 0.000 0.000	280.372 285.928 291.483	12.038 12.029 12.020	530.83 530.43 530.04	530.84 530.49 530.20	00 01 03	6.5769 10.1780 13.7881	6.5729 10.1461 13.6958	•06 •31 •67

Table 7. (Continued)

I D	Data Point No.	Weight	Temp.	Dens exp mol/L		Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072	0.000 0.000	303.150 348.150 373.150 380.950 303.150 3380.950 303.150 348.150 303.150 373.150 380.950 398.150 303.150 348.150 303.150 348.150 303.150 348.150 373.150 380.950 380.950 380.950 380.950 380.950 380.950 348.150 373.150 348.150 373.150 348.150 348.150 373.150 348.150	mol/L .041 .035 .033 .032 .083 .071 .126 .098 .171 .145 .217 .170 .165 .158 .266 .223 .317 .371 .304 .429 .493 .389 .355 .343 .327 .480 .577 .562 .539 .506 .680 .792 .915 .796 .758 .709 1.052 1.208 1.065 1.006 .928 1.398 1.617 1.391 1.292 1.172 1.807 1.641 1.451 2.436 2.099 1.776 5.216 2.738 2.161	kg/m³ 1.79 1.55 1.44 1.41 3.64 3.13 5.55 4.30 7.53 6.40 9.59 7.48 6.95 11.73 9.82 13.99 16.38 13.40 18.93 21.73 17.17 15.66 15.15 14.41 21.17 25.42 24.78 22.29 29.99 34.92 40.33 35.08 33.44 31.25 46.39 51.66 71.29 51.66 71.29 61.33 56.99 79.68 72.35 64.00 107.41 72.57 72.30 72.37	1.80 1.56 1.45 1.42 3.67 3.16 5.59 4.34 7.59 6.45 9.66 7.53 7.35 7.00 11.83 9.90 14.09 16.48 13.51 19.00 21.68 17.31 15.75 15.33 14.50 21.33 25.62 24.84 24.07 22.58 30.22 35.19 40.64 35.08 33.79 31.37 46.71 53.65 46.93 44.80 41.02 61.91 72.55 61.23	807478837979819880788266 -1.03757971598134218354 -1.2062777627 -1.22 -1.28757627 -1.0438697009 -1.0024 -1.7317	MPa • 1013 • 1013 • 1013 • 1013 • 2027 • 2027 • 3040 • 3040 • 4053 • 4053 • 5066 • 5066 • 5066 • 5066 • 5066 • 5066 • 5066 • 5066 • 10680 • 7093 • 8106 • 8106 • 9119 1 • 0133 1 • 013	MPa 1005 1006 1005 1005 1005 2011 2011 3016 3011 4023 4023 5028 5034 5016 5030 6036 6036 6036 7049 8066 8046 9094 10019 10058 10083 10020 10074 12079 14096 15164 15037 15025 16115 18134 20156 20264 20091 20190 22190 22190 22190 22190 22190 23190 24217 25348 25139 25283 26287 28164 30430 30161 30363 335411 35174 35468 40299 40185 40547 45284 44818 45528	** **80 .74 .78 .83 .77 .78 .77 .96 .76 .76 .76 .64 1.00 .73 .71 .73 .62 .50 .74 .27 -17 .74 .49 1.12 .58 .66 .63 .23 1.08 1.16 .60 .58 .54 .01 .87 .33 .46 .42 -07 .77 .19 .22 .73 -11
4	2084	0.000	373.150	6.656	293.50	294.08	20	4.7623	4.7571	•11

Table 7. (Continued)

ID	Data Point	Weight	Temp.	Dens	ot .	Density calc,	Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mo1/L	kg/m ²	kg/m ²	%	MPa	MPa	Z
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		Weight 0.000	Temp. K 373.150 373.150 373.150 380.950 398.150 380.950 380.950 380.950 373.150			Density calc kg/m3 303.69 310.98 316.91 203.65 117.53 336.86 280.62 146.83 295.54 306.54 349.73 311.11 184.72 359.44 328.55 223.59 367.34 340.91 255.72 374.05 350.59 279.93 379.91 358.59 279.88 385.12 365.44 311.73 389.83 371.45 322.88 394.14 376.82 332.19 398.12 381.68 340.18 401.81 386.13 347.17 405.27 390.24 353.39		Pexpt MPa 4.8636 4.9649 5.0663 5.0663 5.0663 5.5729 5.5729 5.5729 5.5729 5.5729 5.5729 5.5729 5.60795 6.0795 6.0795 6.0795 6.0795 6.0861 6.5861 6.5861 7.0928 7.0928 7.0928 7.0928 7.5994 7.5994 7.5994 7.5994 8.1060	Pcalc MPa 4.8606 4.9739 5.0881 4.9509 5.0442 5.6259 5.4473 5.5444 5.6303 5.8286 6.2424 5.9374 6.0491 6.8106 6.4027 6.5697 7.3438 6.9071 7.0726 7.9082 7.3814 7.5692 8.3447 7.8705 8.0753 8.9499 8.4143 8.6394 9.5117 8.9092 9.2028 10.0607 9.3943 9.8010 10.6234 9.8804 10.3155 11.1166 10.3399 10.8709 11.6003 11.8007 11.4115	
4 4 4 4 4	2127 2128 2129 2130 2131 2132	0.000 0.000 0.000 0.000 0.000	398.150 373.150 380.950 398.150 373.150 380.950	8.082 9.320 8.876 8.204 9.376 8.960	356.41 410.97 391.42 361.77 413.46 395.10	353.39 408.51 394.06 359.01 411.58 397.63	.85 .60 67 .77 .46	11.1458 11.6524 11.6524 11.6524 12.1590 12.1590	11.4115 12.0564 11.2983 11.9203 12.4833 11.7969	-2.33 -3.35 3.13 -2.25 -2.60 3.07
4 4 4 4 4 4 4	2133 2134 2135 2136 2137 2138 2139 2140	0.000 0.000 0.000 0.000 0.000 0.000 0.000	398.150 373.150 380.950 398.150 373.150 380.950 398.150 398.150	8.315 9.431 9.038 8.412 9.486 9.120 8.501 8.656	366.67 415.87 398.55 370.96 418.31 402.15 374.85 381.70	364.13 414.49 400.99 368.83 417.25 404.16 373.19 381.06	.70 .33 61 .58 .25 50 .44	12.1590 12.6656 12.6656 12.6656 13.1723 13.1723 14.1855	12.4273 12.9157 12.2950 12.9080 13.3720 12.8472 13.3749 14.2734	-2.16 -1.94 3.01 -1.88 -1.49 2.53 -1.52 62

Table 7. (Continued)

10	Data Point	Weight	Temp.	Dens exp	r ·	Density calc	Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mol/L	kg/m-	kg/m ⁻	%	MPa	мРа	Z
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Point No. 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2170 2171 2172 2173 2174 2175 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187	0.000 0.000	K 423.150 473.150 526.370 423.150 473.150 526.370 423.150 473.150 526.370 423.150 473.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 423.150 526.370 570.450 609.310 423.150 526.370 570.450 609.310 423.150	expt mol/L .029 .026 .023 .087 .078 .070 .147 .131 .117 .304 .266 .236 .469 .408 .359 .328 .646 .555 .485 .441 .835 .709 .614 .557 1.038 .868 .747 .675 1.258 1.034 .883 .795 1.498 1.207 1.021 .917 .846 1.580 1.389 1.164 1.041 2.064 1.580 1.309 1.165 1.070 2.392	kg/m³ 1.27 1.13 1.02 3.85 3.43 3.07 6.50 5.76 5.14 13.39 11.75 10.41 20.69 17.99 15.82 14.46 28.47 24.49 21.39 19.47 36.81 31.24 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 27.09 24.57 45.78 38.26 32.94 29.77 55.46 45.60 38.92 35.06 66.06 53.24 45.04 40.44 37.31 45.88 91.02 69.66 57.78 51.31 45.88 91.02 69.66 57.72 51.31	calc kg/m ³ 1.28 1.14 1.03 3.88 3.45 3.09 6.54 5.80 5.18 13.46 11.82 10.50 20.79 18.07 15.94 14.56 28.59 24.55 21.51 19.57 36.91 31.27 27.20 24.66 45.87 38.27 33.02 29.83 55.56 45.55 38.98 35.07 66.15 53.13 45.07 40.39 37.13 77.84 61.05 51.30 45.78 90.88 69.34 57.67 51.30 45.78 90.88 69.34 57.67 51.30	Diff. 7776777677767883707487555981494173674123551801272810403518012720181216011321051801272018210518012720182105180127201821051801272018210518012720182105180127201821051801272018210518012720182101010102010101020101010101010101	MPa 1013 1013 1013 3040 3040 5066 5066 5066 10133 101	MPa •1005 •1006 •1005 •3017 •3016 •3015 •5032 •5029 •5023 1.0079 1.0074 1.0053 1.5130 1.5140 1.5099 2.0159 2.0159 2.0159 2.0164 2.5270 2.5309 2.5236 2.5245 3.0354 3.0395 3.0322 3.0341 3.5415 3.5500 3.5412 3.5460 4.0491 4.0603 4.0510 4.0583 4.0714 4.5617 4.5733 4.5604 4.5617 4.5733 4.5604 5.0716 5.0856 5.0698 5.0793 5.5707	01ff. 77 .76 .77 .76 .77 .75 .77 .83 .68 .74 .86 .53 .58 .79 .46 .39 .71 .66 .37 .21 .53 .50 .24 .09 .38 .34 .14 .01 .25 .19 .14 -10 .15 .01 .10 -18 .0513053002221138072658 .04
4 4 4 4 4 4	2188 2189 2190 2191 2192 2193 2194	0.000 0.000 0.000 0.000 0.000 0.000	473.150 526.370 570.450 423.150 473.150 526.370 570.450	1.777 1.456 1.291 2.751 1.981 1.606 1.418	78.36 64.20 56.95 121.30 87.35 70.83 62.54	78.01 64.19 56.78 122.17 87.08 70.85 62.40	.45 .02 .29 71 .31 03	5.5729 5.5729 5.5729 6.0795 6.0795 6.0795 6.0795	5.5929 5.5741 5.5879 6.0544 6.0942 6.0779 6.0923	36 02 27 .41 24 .03 21
4	2195 2196	0.000	609.310 423.150	1.297 3.150	57.18 138.88	56.82 140.82	-1-37	6.0795 6.5861	6.1165 6.5360	60 .77

Table 7. (Continued)

ID	Data Point	Weight	Temp.	Dens	ot '	Density	Density Diff.	Pexpt	Pcalc	Pressure
	No.		K	mo1/L	kg/m ³	kg/m ³	%	MPa	MPa	Z
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Point No. 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2218 2219 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237	0.000 0.000	K 473.150 526.370 570.450 423.150 526.370 570.450 609.310 423.150 473.150 526.370 570.450 609.310 423.150 473.150 526.370 570.450 423.150 473.150 526.370 570.450 423.150 473.150 526.370 570.450 423.150 473.150 526.370 570.450 423.150 473.150 526.370 570.450 609.310 423.150 473.150 526.370 570.450 609.310 423.150 473.150 526.370 570.450 423.150 473.150 526.370 570.450 609.310 423.150 473.150 526.370 570.450 609.310 423.150 473.150 526.370 570.450 609.310 423.150 473.150	mol/L 2.193 1.760 1.547 3.596 2.414 1.916 1.676 2.642 2.074 1.806 4.558 2.876 2.235 1.937 1.755 5.004 3.118 2.399 2.070 5.389 3.362 2.566 2.235 1.987 5.740 3.607 2.733 2.334 6.056 3.854 2.901 2.468 2.218 6.340 4.100 3.068 2.6601 6.589 4.347	96.70 77.59 68.21 158.56 106.46 84.47 73.90 67.26 179.76 116.50 91.46 79.66 200.98 126.83 98.57 85.40 820.65 137.48 105.79 91.26 237.64 148.24 113.16 97.13 87.60 253.12 159.05 120.52 102.94 267.06 169.94 127.92 108.83 97.80 279.59 180.81 135.28 114.71 290.57 191.67	calc kg/m ³ 96.58 77.66 68.09 161.20 106.50 84.62 73.84 66.91 182.37 116.81 91.72 79.67 203.00 127.46 98.94 85.56 77.14 222.11 138.37 106.28 91.50 239.42 149.44 113.71 97.49 87.50 254.90 160.54 121.22 103.53 268.58 171.54 128.77 109.59 97.94 280.60 182.32 136.33 115.67 291.18	Diff. % -1309181.64041708531.43272701994937183165452674804937565656569357565693575866701436837783778357	MPa 6.5861 6.5861 7.0928 7.0928 7.0928 7.0928 7.0928 7.0928 7.0928 7.5994 7.5994 7.5994 7.5994 8.1060	MPa 6.5924 6.5807 6.5970 7.0289 7.0907 7.0821 7.0979 7.1281 7.5369 7.5843 7.5816 7.5984 8.0550 8.0764 8.0802 8.0929 8.1293 8.5715 8.5715 8.5796 8.5923 9.0645 9.0817 9.0887 9.1294 9.5644 9.5578 9.5790 9.5769 10.0731 10.0584 10.0756 10.0689 10.1193 10.5673 10.5690 10.5591 11.1148 11.0917	Diff. % 10 .0816 .91 .03 .150750 .83 .20 .23 .01 .63 .37 .32 .1629 .47 .48 .39 .24 .60 .60 .41 .3411 .64 .71 .49 .51 .59 .74 .56 .63 .13 .43 .68 .66 .76 .28 .49
4 4 4 4	2238 2239 2240 2241	0.000 0.000 0.000 0.000	526.370 570.450 609.310 423.150	3.234 2.735 2.448 6.815	142.60 120.59 107.95 300.51	143.88 121.75 108.42 300.54	89 95 44 01	11.1458 11.1458 11.1458 11.6524	11.0593 11.0490 11.0999 11.6503	•78 •88 •41 •02
4 4 4 4 4 4 4 4 4	2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	473.150 526.370 570.450 423.150 473.150 526.370 570.450 609.310 423.150 473.150 526.370	4.591 3.400 2.869 7.017 4.834 3.563 3.001 2.676 7.184 5.070 3.728	202.44 149.92 126.52 309.41 213.18 157.10 132.33 118.02 316.80 223.57 164.39	202.81 151.39 127.83 308.89 212.42 158.81 133.89 118.88 316.39 221.58 166.13	01 18 97 -1.03 .17 .35 -1.08 -1.16 72 .13	11.6524 11.6524 11.6524 12.1590 12.1590 12.1590 12.1590 12.1590 12.1590 12.6656	11.63334 11.55330 11.55428 12.1924 12.1998 12.0419 12.0286 12.0755 12.6547 12.7791 12.5444	.02 .16 .86 .95 27 33 .97 1.08 .69 23 89

Table 7. (Continued)

IĐ	Data Point No.	Weight	Temp.	Dens exp mol/L	sity ot kg/m ³	Density calc kg/m ³	Density Diff. %	P _{exp} † MPa	Pcalc MPa	Pressure Diff.
4	2253	0.000	570.450	3.134	138.22	139.90	-1.21	12.6656	12.5233	1.14
4	2254	0.000	423.150	7.336	323.50	323.19	.10	13.1723	13.1965	18
4	2255	0.000	473.150	5.299	233.66	230.30	1.46	13.1723	13.3747	-1.51
4	2256	0.000	526.370	3.890	171.52	173.32	-1.04	13.1723	13.0446	•98
4	2257	0.000	570.450	3.266	144.04	145.88	-1.26	13.1723	13.0157	1.20
4	2258	0.000	609.310	2.903	128.03	129.27	96	13.1723	13.0506	•93
4	2259	0.000	423.150	7.468	329.32	329.39	02	13.6789	13.6728	•04
4	2260	0.000	473.150	5.518	243.35	238.59	1.99	13.6789	13.9819	-2.17
4	2261	0.000	526.370	4.054	178.75	180.36	89	13.6789	13.5619	•86
4	2262	0.000	570.450	3.398	149.84	151.78	-1.28	13.6789	13.5117	1.24
4	2263	0.000	423.150	7.585	334.47	335.08	18	14.1855	14.1286	.40
4	2264	0.000	609.310	3.127	137.88	139.53	-1.18	14.1855	14.0217	1.17

Table 7. (Continued)

		·								
ID	Data Point	Weight	Temp.	Den: exp	sity ot	Density calc	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	No.		K	mol/L	kg/m ³	calc kg/m ³	Z	MPa	MPa	Z
79	2265	0.000	373.150	3.851	169.83	178.91	-5.07	4.4549	4.4352	.44
79	2266	0.000	373.150	2.457	108.34	108.45	10	4.0431	4.0417	•03
79	2267	0.000	373.150	1.566	69.07	68.85	•31	3.2664	3.2724	18
79	2268	0.000	373.150	1.000	44.09	44.05	•09	2.4176	2.4191	06
79	2269	0.000	373.150	•638	28.13	28.16	11	1.6911	1.6895	.10
79	2270	0.000	373.150	•407	17.93	17.97	23	1.1423	1.1400	• 20
79	2271	0.000	373.150	•259	11.43	11.47	28	.7553	.7533	•26
79 79	2272	0.000	373.150 373.150	.165 .105	7.28 4.65	7.31	30 30	•4923	•4909	.28 .29
79	2273 2274	0.000	393.190	3.405	150.13	4.66 150.66	35	•3188 5•3854	.3179 5.3788	•12
79	2275	0.000	393.190	2.446	107.86	107.69	•16	4.6967	4.7002	07
79	2276	0.000	393.190	1.756	77.43	77.24	•25	3.9155	3.9214	15
79	2277	0.000	393.190	1.261	55.62	55.57	•08	3.1362	3.1381	06
79	2278	0.000	393.190	•906	39.96	40.00	11	2.4358	2.4337	•09
79	2279	0.000	393.190	•651	28.70	28.77	24	1.8496	1.8458	.21
79	2280	0.000	393.190	.467	20.60	20.67	32	1.3820	1.3780	.29
79	2281	0.000	393.190	• 335	14.79	14.84	35	1.0207	1.0174	•32
79	2282	0.000	393.190	.241	10.62	10.66	 36	.7477	.7451	.34
79 79	2283 2284	0.000	407.500 407.500	3.749 2.651	165.34 116.89	169.19 116.78	-2.27 .10	6.4103 5.3802	6.3445 5.3830	1.04 05
79 79	2285	0.000	407.500	1.903	83.92	83.73	•23	4.4409	4.4473	14
79	2286	0.000	407.500	1.367	60.29	60.24	.08	3.5410	3.5431	06
79	2287	0.000	407.500	.982	43.32	43.38	13	2.7448	2.7420	.10
79	2288	0.000	407.500	.706	31.12	31.21	28	2.0825	2.0775	.24
79	2289	0.000	407.500	•507	22.35	22.43	36	1.5552	1.5502	•32
79	2290	0.000	407.500	•364	16.04	16.10	 39	1.1480	1.1438	•36
79	2291	0.000	407.500	•261	11.51	11.56	39	.8404	.8373	•37
79	2292	0.000	407.430	2.812	124.01	123.69	•26	5.5377	5.5449	13
79 79	2293 2294	0.000	407.430 407.430	1.791 1.140	78.97 50.28	78.54 50.17	•55 •22	4.2594 3.0811	4.2747 3.0863	36 17
79	2294	0.000	407.430	•726	32.02	32.05	10	2.1303	2.1285	•09
79	2296	0.000	407.430	•462	20.39	20.44	 27	1.4294	1.4259	•24
79	2297	0.000	407.430	•294	12.98	13.02	33	•9409	•9380	•31
79	2298	0.000	407.430	. 187	8.26	8.29	34	.6118	.6098	•33
79	2299	0.000	422.970	2.742	120.92	120.64	.24	6.0287	6.0369	14
79	2300	0.000	422.970	1.969	86.84	86.42	.49	4.8951	4.9113	33
79	2301	0.000	422.970	1.414	62.36	62.15	•33	3.8646	3.8744	25
79	2302	0.000	422.970	1.016	44.79	44.76	•07	2.9772	2.9789	06
79	2303	0.000	422.970	.729	32.17	32.21	14	2.2502	2.2474	•13
79 79	2304 2305	0.000	422.970	•524 •376	23.10 16.59	23.16 16.65	27 34	1.6766 1.2364	1.6725 1.2325	•25 •32
79	2306	0.000	422.970 422.970	•270	11.91	11.96	36	•9051	•9020	•35
79	2307	0.000	422.970	.194	8.55	8.58	 36	•6588	•6565	•35
79	2308	0.000	423.020	1.613	71.14	70.69	•64	4.2539	4.2735	46
79	2309	0.000	423.020	1.158	51.07	50.90	.34	3.3068	3.3157	27
79	2310	0.000	423.020	.832	36.67	36.65	•05	2.5168	2.5179	04
79	2311	0.000	423.020	•597	26.33	26.37	14	1.8850	1.8825	• 13
79	2312	0.000	423.020	.429	18.90	18.94	25	1.3945	1.3913	.23
79	2313	0.000	423.020	•308	13.57	13.61	 31	1.0237	1.0207	•30
79 79	2314 2315	0.000	423.020	•221 •159	9.75	9.78	33 33	.7467 .5422	.7443 .5404	•32 •32
19	2313	0.000	423.020	• 159	7.00	7.02	33	• 5422	• 2404	•24

Table 7. (Continued)

		, ,								
ID	Data	Weight	Temp.	Dens	sity	Density	Density	Pexpt	Pcalc	Pressure
	Point	3		exp	nt '	calc_	Diff.	expi	Carc	Diff.
	No.		K	mol/L	kg/m ³	kg/m ³	%	MPa	MPa	a/ /o
					Q.	0.	,			,-
78	2316	0.000	322.972	10.456	461.10	460.52	.12	4.0710	4.2016	-3.11
78	2317	0.000	328.168	10.452	460.92	460.35	.13	6.1869	6.3270	-2.22
78	2318	0.000	332.609	10.449	460.78	460.21	.12	7.9977	8.1433	-1.79
78	2319	0.000	337.762	10.445	460.62	460.06	.12	10.0989	10.2485	-1.46
78	2320	0.000	342.618	10.442	460.47	459.94	.11	12.0814	12.2303	-1.22
78	2321	0.000	347.144	10.439	460.33	459.82	.11	13.9231	14.0747	-1.08
78	2322	0.000	352.944	10.435	460.15	459.66	.11	16.2821	16.4344	93
78	2323	0.000	363.122	10.428	459.84	459.40	•09	20.4150	20.5634	72
78	2324	0.000	372.349	10.422	459.56	459.15	•09	24.1420	24.2915	62
78	2325	0.000	382.692	10.415	459.25	458.86	•09	28.2987	28.4532	54
78	2326	0.000	393.048	10.408	458.94	458.55	•09	32.4341	32.5981	50
78	2327	0.000	403.168	10.401	458.64	458.24	•09	36.4506	36.6286	49
78	2328	0.000	414.877	10.393	458.30	457.87	•09	41.0620	41.2645	49
78	2329	0.000	428.006	10.384	457.91	457.73	•04	46.3353	46.4240	19
78	2330	0.000	446.159	10.372	457.38	456.82	.12	53. 1897	53.4955	57
78	2331	0.000	465.974	10.359	456.79	456.36	•10	60.8626	61.1220	42
78	2332	0.000	327.800	10.298	454.11	453.27	. 19	4.4479	4.6246	-3.82
78	2333	0.000	337.927	10.291	453.79	452.95	• 18	8.3701	8.5693	-2.32
78	2334	0.000	345.864	10.285	453.54	452.74	. 18	11.4481	11.6574	-1.80
78	2335	0.000	355.196	10.279	453.26	452.50	.17	15.0664	15.2826	-1.42
78	2336	0.000	367.383	10.270	452.90	452.20	.15	19.7797	20.0013	-1.11
78	2337	0.000	375.052	10.265	452.67	452.00	.15	22.7350	22.9607	98
78	2338	0.000	384.818	10.259	452.39	451.74	.14	26.4836	26.7158	87
78	2339	0.000	394.641	10.252	452.10	451.47	.14	30.2325	30.4770	80
78	2340	0.000	402.913	10.247	451.86	451.23	.14	33.3753	33.6306	76
78	2341	0.000	416.717	10.238	451.46	450.82	.14	38.5825	38.8657	73
78	2342	0.000	432.648	10.227	451.00	450.32	.15	44.5345	44.8589	 72
78	2343	0.000	453.599	10.214	450.40	449.63	.17	52.2548	52.6584	77
78	2344	0.000	472.842	10.201	449.84	448.96	.20	59.2384	59.7383	84
78	2345	0.000	330.263	9.973	439.77	438.99	.18	2.7707	2.8935	-4.25
78	2346	0.000	341.713	9.965	439.41	438.55	•20	6.7553	6.9167	-2.33
78	2347	0.000	352.841	9.957	439.09	438.25	.19	10.6530	10.8328	-1.66
78	2348	0.000	363.696	9.950	438.77	438.01	. 18	14.4640	14.6504	-1.27
78	2349	0.000	377.648	9.941	438.38	437.69	•16	19.3554	19.5471	98
78	2350	0.000	397.297	9.929	437.83	437.21	.14	26.2115	26.4104	75
78	2351	0.000	412.796	9.919	437.40	436.81	.13	31.5790	31.7896	66
78	2352	0.000	431.026	9.907	436.89	436.30	•14	37.8361	38.0707	62
78	2353	0.000	448.440	9.897	436.41	435.79	• 14	43.7474	44.0194	62
78	2354	0.000	463.694	9.887	435.99	435.32	• 16	48.8692	49.1862	64
78	2355	0.000	480.702	9.876	435.52	434.77	• 17	54.5166	54.8963	69
78	2356	0.000	496.299	9.867	435.09	434.25	. 19	59.6332	60.0842	75
78	2357	0.000	330.963	9.940	438.33	437.52	• 18	2.7872	2.9129	-4.31
78	2358	0.000	331.814	9.939	438.30	437.49	. 18	3.0816	3.2087	-3.96
78	2359	0.000	336.848	9.936	438.14	437.29	. 19	4.8135	4.9583	-2.92
78	2360	0.000	341.988	9.932	437.99	437.12	•20	6.5880	6.7472	-2.36
78	2361	0.000	347.723	9.928	437.82	436.95	•20	8.5731	8.7450	-1.97
78	2362	0.000	355.121	9.924	437.60	436.77	. 19	11.1422	11.3224	-1.59
78	2363	0.000	368.842	9.915	437.21	436.46	•17	15.9117	16.0991	-1.16
78	2364	0.000	383.023	9.906	436.81	436.14	.15	20.8327	21.0224	90
78	2365	0.000	402.762	9.893	436.27	435.66	.14	27.6429	27.8412	71
78	2366	0.000	422.783	9.881	435.71	435.14	.13	34.4894	34.7048	62
78	2367	0.000	443.127	9.868	435.15		. 14	41.3682	41.6160	60
78	2368	0.000	342.839	9.231	407.08	406.41	•16	2.7845	2.8447	-2.12
78	2369	0.000	350.822	9.226	406.86	405.98	•22	4.9609	5.0550	-1.86
78	2370	0.000	361.070	9.220	406.59	405.67	•23	7.7955	7.9133	-1.49
78	2371	0.000	369.188	9.215	406.37	405.51	•21	10.0616	10.1875	-1.24

Table 7. (Continued)

ID	Data Point No.	Weight	Temp.	Dens exp mol/L	sity ot kg/m ³	Density calc kg/m ³	Density Diff.	Pexpt MPa	Pcalc MPa	Pressure Diff.
	NO.		N	IIIO I / L	Kg/III-		jo	MEG	Mrd	<i>/</i> o
78 78 78 78 78 78 78 78 78 78 78 78 78	2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	376.679 386.501 407.554 432.160 457.260 481.931 511.431 548.961 354.671 363.831 376.625 392.838 409.200 432.549 451.661	9.211 9.205 9.193 9.179 9.165 9.151 9.134 9.113 8.562 8.557 8.550 8.542 8.533 8.521 8.511	406.18 405.93 405.40 404.78 404.15 403.53 402.80 401.86 377.56 377.03 376.66 376.28 375.74 375.31	405.37 405.20 404.84 404.35 403.79 403.19 402.42 401.37 376.62 376.05 375.73 375.53 375.35 375.07 374.77	.20 .18 .14 .11 .09 .09 .09 .12 .25 .34 .35 .30 .25	12.1606 14.9208 20.8432 27.7374 34.7087 41.4846 49.4692 59.4184 3.6401 5.6536 8.5296 12.2320 15.9979 21.3877 25.7887	12.2905 15.0510 20.9655 27.8505 34.8212 41.6072 49.6225 59.6505 3.6908 5.7435 8.6489 12.3646 16.1315 21.5103 25.9010	-1.0687584132293139 -1.37 -1.57 -1.38 -1.07835743
78	2387	0.000	472.311	8.500	374.84	374.41	•11	30.5185	30.6226	34
78	2388	0.000	497.096	8.487	374.27	373.93	•09	36.1519	36.2486	27
78 78 78 78 78 78 78 78 78 78 78 78 78 7	2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	521.148 546.198 570.278 364.812 376.448 392.791 412.648 432.534 452.553 473.034 492.234 512.405 530.760 550.128 569.593 369.350 378.140	8.475 8.462 8.450 7.541 7.535 7.528 7.510 7.510 7.492 7.483 7.474 7.466 7.458 7.458 7.449 6.587 6.584	373.73 373.15 372.61 332.52 332.28 331.95 331.56 331.16 330.77 330.37 329.99 329.60 329.24 328.86 328.48 290.47 290.32	373.42 372.86 372.30 331.63 330.15 330.09 330.15 330.11 329.98 329.80 329.57 329.34 329.34 329.77 287.83 284.88	.08 .08 .08 .27 .65 .60 .45 .31 .20 .12 .06 .01 03 06	41.5604 47.1297 52.4134 4.0634 5.9058 8.6004 11.9520 15.5480 18.7801 22.2902 25.5709 29.0010 32.1055 35.3592 38.6055 4.2600 5.2858	41.6583 47.2305 52.5324 4.0800 5.9747 8.7020 12.0619 15.4477 18.8608 22.3467 25.6024 29.0057 32.0843 35.3119 38.5319 4.2717 5.3462	23212341 -1-15 -1-17916543251202 -07 -13 -1927 -1-13
78	2405	0.000	393.489	6.578	290.05	285.70	1.52	7.1701	7.2734	-1.42
78 78 78 78 78 78 78 78 78 78 78 78 78 7	2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2420 2421 2422 2423 2424 2425 2426 2427	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	413.546 432.129 452.677 473.033 491.232 510.749 530.884 550.233 570.645 373.371 384.040 393.158 412.539 451.584 472.918 492.382 511.062 530.956 550.999 573.416	6.570 6.563 6.555 6.547 6.540 6.533 6.525 6.518 6.510 6.002 5.997 5.992 5.984 5.976 5.969 5.969 5.961 5.953 5.948 5.941 5.934 5.926	289.71 289.40 289.05 288.71 288.40 288.07 287.74 287.41 287.07 264.69 264.45 264.25 263.88 263.53 263.22 262.88 262.49 262.30 261.97 261.66 261.31	286.74 287.32 287.68 287.84 287.89 287.86 287.78 287.66 287.49 255.53 257.17 258.51 260.23 261.18 261.69 261.99 262.14 262.18 262.18 262.11 262.00	1.04 .72 .48 .30 .18 .07 02 09 15 3.59 2.83 2.22 1.40 .90 .59 .34 .13 .05 08 17 26	9.7096 12.0990 14.7586 17.3975 19.7553 22.2751 24.8659 27.3423 29.9378 4.5957 5.6751 6.6267 8.6919 10.8549 12.9243 15.2462 17.3626 19.3868 21.5355 23.6887 26.0839	9.8312 12.2175 14.8615 17.4781 19.8108 22.3024 24.8595 27.3020 29.8617 4.6220 5.7453 6.7173 8.7996 10.9587 13.0137 15.3121 17.3940 19.3994 21.5119 23.6292 25.9808	-1.249769462812 .03 .15 .2557 -1.22 -1.35 -1.229569431807 .11 .25 .40

Table 7. (Continued)

1D	Data Point No.	Weight	Temp.	Dens exp mol/L	,	Density calc kg/m ³	Density Diff.	P _{expt}	Pcalc MPa	Pressure Diff.
78	2428	0.000	378.257	5.014	221.09	214.26	3.19	4.9067	4.9317	51
78	2429	0.000	387.620	5.010	220.92	215.93	2.31	5.6512	5.6926	73
78	2430	0.000	397.884	5.006	220.73	216.97	1.74	6.4733	6.5245	79
78	2431	0.000	412.591	5.000	220.50	217.90	1.19	7.6571	7.7131	73
78	2432	0.000	432.441	4.994	220.20	218.63	•72	9.2588	9.3099	55
78	2433	0.000	451.915	4.987	219.93	219.04	.4!	10.8290	10.8680	36
78	2434	0.000	472.446	4.981	219.66	219.29	. 17	12.4804	12.5009	16
78	2435	0.000	492.229	4.975	219.40	219.43	01	14.0664	14.0642	•02
78	2436	0.000	511.521	4.970	219.15	219.48	 15	15.6053	15.5790	.17
78	2437	0.000	530.931	4.964	218.90	219.49	27	17.1466	17.0930	•31
78	2438	0.000	550.497	4.958	218.64	219.46	37	18.6917	18.6090	•44
78	2439	0.000	572.459	4.952	218.36	219.38	47	20.4148	20.2977	• 58
78	2440	0.000	372.414	3.733	164.60	164.21	•24	4.3777	4.3787	02
78	2441	0.000	383.158	3.729	164.46	163.52	•57	4.9839	4.9904	13
78	2442	0.000	393.257	3.727	164.33	163.39	• 58	5.5395	5.5501	19
78	2443	0.000	412.606	3.721	164.08	163.37	•44	6.5841	6.5979	21
78	2444	0.000	432.037	3.716	163.86	163.43	•26	7.6162	7.6282	16
78	2445	0.000	452.165	3.711	163.64	163.48	•10	8.6722	8.6783	07
78	2446	0.000	472.712	3.706	163.43	163.50	04	9.7389	9.7355	•03
78	2447	0.000	492.367	3.702	163.23	163.50	 17	10.7498	10.7350	• 14
78	2448	0.000	511.981	3.697	163.04	163.48	27	11.7501	11.7223	•24
78	2449	0.000	531.510	3.693	162.85	163.44	 36	12.7383	12.6961	• 33
78	2450	0.000	551.623	3.689	162.66	163.38	45	13.7487	13.6902	•43
78	2451	0.000	569.383	3.685	162.49	163.33	 52	14.6348	14.5606	•51
78	2452	0.000	383.172	2.474	109.11	108.37	•69	4.3809	4.3932	28
78	2453	0.000	393.351	2.472	109.03	108.10	.86	4.7103	4.7294	40
78	2454	0.000	403.287	2.471	108.95	107.85	1.02	5.0237	5.0504	53
78	2455	0.000	413.008	2.469	108.87	107.75	1.03	5.3277	5.3590	58
78	2456	0.000	432.821	2.465	108.71	107.67	•96	5.9379	5.9745	61
78	2457	0.000	452.480	2.462	108.55	107.62	•86	6.5319	6.5712	60
78	2458	0.000	472.835	2.458	108.39	107.59	• 74	7.1382	7.1778	55
78	2459	0.000	492.354	2.455	108.25	107.57	•64	7.7119	7.7506	50
78	2460	0.000	512.363	2.452	108.11	107.54	• 54	8.2936	8.3302	44
78	2461	0.000	532.459	2.449	107.98	107.50	.44	8.8719	8.9056	38
78	2462	0.000	551.517	2.446	107.85	107.46	•36	9.4157	9.4454	31
78	2463	0.000	570.948	2.443	107.72	107.42	• 28	9.9653	9.9908	26

Table 7. (Continued)

Density		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,								
\$2 2464 1,000 369,850 .800 35,28 35,27 .03 2,0079 2,0084 -,03 \$2 2466 1,000 373,150 .800 35,28 35,27 .03 2,0350 2,0350 -,03 \$2 2466 1,000 388,150 .800 35,28 35,26 .05 2,2359 2,2379 -,04 \$2 2467 1,000 423,150 .800 35,28 35,26 .05 2,2359 2,2379 -,04 \$2 2468 1,000 448,150 .800 35,28 35,26 .04 2,4355 2,4353 -,03 \$2 2468 1,000 448,150 .800 35,28 35,27 .03 2,6314 2,632602 \$2 2470 0,000 375,150 .800 35,28 35,27 .03 2,6314 2,632602 \$2 2471 0,000 375,150 .800 35,28 35,27 .03 2,6079 2,008402 \$2 2472 0,000 398,150 .800 35,28 35,26 .05 2,2359 2,2379 -,04 \$2 2473 0,000 448,150 .800 35,28 35,26 .05 2,2359 2,2379 -,04 \$2 2473 0,000 448,150 .800 35,28 35,26 .05 2,2359 2,2379 -,04 \$2 2473 0,000 448,150 .800 35,28 35,27 .03 2,0550 2,2359 -,03 \$2 2474 0,000 448,150 .800 35,28 35,27 .03 2,0550 2,235904 \$2 2475 0,000 448,150 .800 35,28 35,27 .02 2,6315 2,632002 \$2 2476 1,000 309,150 .800 35,28 35,29 -,02 3,0182 3,0176 .02 \$2 2477 1,000 523,150 .800 35,28 35,29 -,02 3,0182 3,0176 .02 \$2 2477 1,000 523,150 .800 35,28 35,29 -,02 3,0182 3,0176 .02 \$2 2478 1,000 548,150 .800 35,28 35,29 -,04 3,2996 3,2986 .00 \$2 2479 1,000 573,150 .800 35,28 35,30 -,06 3,3998 3,3980 .05 \$2 2479 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,3980 .05 \$2 2480 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2480 1,000 398,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,599 .00 \$2 2481 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2491 1,000 598,150 .800 35,28 35,30 -,06 3,5998 3,5980 .05 \$2 2492 1,000 398,150 .000 398,150 .000 398,150 .000 398,150 .0	ID		Weight	Temp.		+	Density calc		Pexpt	Pcalc	
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52 2505 1.000 473.150 1.500 66.15 65.82 .50 4.8537 4.8738 41 52 2506 1.000 498.150 1.500 66.15 65.86 .43 5.2557 5.2751 37 52 2507 1.000 523.150 1.500 66.15 65.90 .37 5.6538 5.6721 32 52 2508 1.000 548.150 1.500 66.15 65.95 .29 6.0496 6.0656 26 52 2509 1.000 573.150 1.500 66.15 65.98 .24 6.4416 6.4561 22 52 2510 1.000 598.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 623.150 1.500 66.15 66.07 .12 7.2222 7.2302 11 52 2512 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1	52	2503	1.000	423.150		66.15	65.74	•62	4.0344	4.0529	46
52 2506 1.000 498.150 1.500 66.15 65.86 .43 5.2557 5.2751 37 52 2507 1.000 523.150 1.500 66.15 65.90 .37 5.6538 5.6721 32 52 2508 1.000 548.150 1.500 66.15 65.95 .29 6.0496 6.0656 26 52 2509 1.000 573.150 1.500 66.15 65.98 .24 6.4416 6.4561 22 52 2510 1.000 598.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 623.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1	52	2504	1.000	448.150	1.500	66.15	65.77	•57	4.4470	4.4670	45
52 2507 1.000 523.150 1.500 66.15 65.90 .37 5.6538 5.6721 32 52 2508 1.000 548.150 1.500 66.15 65.95 .29 6.0496 6.0656 26 52 2509 1.000 573.150 1.500 66.15 65.98 .24 6.4416 6.4561 22 52 2510 1.000 598.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 623.150 1.500 66.15 66.07 .12 7.2222 7.2302 11 52 2512 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1.000 398.150 2.000 88.19 87.5	52	2505	1.000	473.150	1.500	66.15	65.82	•50	4.8537	4.8738	41
52 2507 1.000 523.150 1.500 66.15 65.90 .37 5.6538 5.6721 32 52 2508 1.000 548.150 1.500 66.15 65.95 .29 6.0496 6.0656 26 52 2509 1.000 573.150 1.500 66.15 65.98 .24 6.4416 6.4561 22 52 2510 1.000 598.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 623.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2512 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1.000 398.150 2.000 88.19 87.50 .79 4.3375 4.3574 46 52 2515 1	52	2506	1.000	498.150	1.500	66.15	65.86	•43	5.2557	5.2751	37
52 2509 1.000 573.150 1.500 66.15 65.98 .24 6.4416 6.4561 22 52 2510 1.000 598.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 623.150 1.500 66.15 66.07 .12 7.2222 7.2302 11 52 2512 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1.000 398.150 2.000 88.19 87.50 .79 4.3375 4.3574 46 52 2515 1.000 423.150 2.000 88.19 87.54 .74 4.9421 4.9667 49 52 2516 1.000 448.150 2.000 88.19 87.60 .68 5.5318 5.5591 49 52 2517 1		2507	1.000	523.150	1.500	66.15	65.90	•37	5.6538	5.6721	
52 2509 1.000 573.150 1.500 66.15 65.98 .24 6.4416 6.4561 22 52 2510 1.000 598.150 1.500 66.15 66.02 .19 6.8318 6.8442 18 52 2511 1.000 623.150 1.500 66.15 66.07 .12 7.2222 7.2302 11 52 2512 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1.000 398.150 2.000 88.19 87.50 .79 4.3375 4.3574 46 52 2515 1.000 423.150 2.000 88.19 87.54 .74 4.9421 4.9667 49 52 2516 1.000 448.150 2.000 88.19 87.60 .68 5.5318 5.5591 49 52 2517 1	52	2508	1.000	548.150	1.500	66.15	65.95	•29	6.0496	6.0656	26
52 2511 1.000 623.150 1.500 66.15 66.07 .12 7.2222 7.2302 11 52 2512 1.000 369.850 2.000 88.19 87.72 .54 3.6258 3.6344 24 52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1.000 398.150 2.000 88.19 87.50 .79 4.3375 4.3574 46 52 2515 1.000 423.150 2.000 88.19 87.54 .74 4.9421 4.9667 49 52 2516 1.000 448.150 2.000 88.19 87.60 .68 5.5318 5.5591 49 52 2517 1.000 473.150 2.000 88.19 87.68 .58 6.1120 6.1399 45 52 2518 1.000 498.150 2.000 88.19 87.78 .47 6.6860 6.7118 38						66.15	65.98		6.4416	6.4561	
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52 2513 1.000 373.150 2.000 88.19 87.66 .60 3.7111 3.7215 28 52 2514 1.000 398.150 2.000 88.19 87.50 .79 4.3375 4.3574 46 52 2515 1.000 423.150 2.000 88.19 87.54 .74 4.9421 4.9667 49 52 2516 1.000 448.150 2.000 88.19 87.60 .68 5.5318 5.5591 49 52 2517 1.000 473.150 2.000 88.19 87.68 .58 6.1120 6.1399 45 52 2518 1.000 498.150 2.000 88.19 87.78 .47 6.6860 6.7118 38	52			623.150	1.500				7.2222		
52 2514 1.000 398.150 2.000 88.19 87.50 .79 4.3375 4.3574 46 52 2515 1.000 423.150 2.000 88.19 87.54 .74 4.9421 4.9667 49 52 2516 1.000 448.150 2.000 88.19 87.60 .68 5.5318 5.5591 49 52 2517 1.000 473.150 2.000 88.19 87.68 .58 6.1120 6.1399 45 52 2518 1.000 498.150 2.000 88.19 87.78 .47 6.6860 6.7118 38					2.000						
52 2515 1.000 423.150 2.000 88.19 87.54 .74 4.9421 4.9667 49 52 2516 1.000 448.150 2.000 88.19 87.60 .68 5.5318 5.5591 49 52 2517 1.000 473.150 2.000 88.19 87.68 .58 6.1120 6.1399 45 52 2518 1.000 498.150 2.000 88.19 87.78 .47 6.6860 6.7118 38											
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52 2518 1.000 498.150 2.000 88.19 87.78 .47 6.6860 6.711838											
52 2519 1.000 523.150 2.000 88.19 87.87 .37 7.2538 7.276832											
	52	2519	1.000	523.150	2.000	88.19	87.87	•37	7.2538	7.2768	32

Table 7. (Continued)

								_		_
ID	Data	Weight	Temp.	Den: exp	sity	Density	Density Diff.	Pexpt	Pcalc	Pressure Diff.
	Point No.		K	mol/L	kg/m ³	calc kg/m ³	%	MPa	MPa	%
	110									
52	2520	1.000	548.150	2.000	88.19	87.94	.28	7.8167	7.8363	25
52	2521	1.000	573.150	2.000	88.19	88.02	• 19	8.3764	8.3911	18
52	2522	1.000	598.150	2.000	88.19	88.08	.13	8.9310	8.9421	12
52	2523	1.000	623.150	2.000	88.19	88.15	•05	9.4853	9.4896	05
52 52	2524 2525	1.000	369.850 373.150	2.500 2.500	110.24 110.24	109.87 109.73	•34	3.9444 4.0591	3.9484 4.0653	10 15
52	2526	1.000	398.150	2.500	110.24	109.75	. •47	4.8954	4.9130	36
52	2527	1.000	423.150	2.500	110.24	109.52	•66	5.6994	5.7220	39
52	2528	1.000	448.150	2.500	110.24	109.65	• 54	6.4842	6.5083	37
52	2529	1.000	473.150	2.500	110.24	109.79	.41	7.2567	7.2789	31
52	2530	1.000	498.150	2.500	110.24	109.93	• 28	8.0199	8.0378	22
52	2531	1.000	523.150	2.500	110.24	110.05	•17	8.7750	8.7877	14
52	2532	1.000	548.150	2.500	110.24	110.17	•06	9.5247	9.5301	06
52	2533	1.000	573.150	2.500	110.24 110.24	110.27 110.36	03 11	10.2688	10.2663	•02
52 52	2534 2535	1.000	598.150 623.150	2.500 2.500	110.24	110.46	11 19	11.0080 11.7452	10.9972 11.7235	•10 •18
52	2536	1.000	369.850	3.000	132.29	132.30	01	4.1240	4.1240	•00
52	2537	1.000	373.150	3.000	132.29	132.03	•20	4.2701	4.2720	04
52	2538	1.000	398.150	3.000	132.29	131.60	•53	5.3284	5.3404	22
52	2539	1.000	423.150	3.000	132.29	131.73	•42	6.3461	6.3611	24
52	2540	1.000	448.150	3.000	132.29	131.92	• 28	7.3417	7.3554	19
52	2541	1.000	473.150	3.000	132.29	132.10	• 15	8.3227	8.3317	11
52	2542	1.000	498.150	3.000	132.29	132.29	00	9.2945	9.2945	•00
52	2543	1.000	523.150	3.000	132.29 132.29	132.45	 12	10.2570	10.2466	.10
52 52	2544 2545	1.000	548.150 573.150	3.000 3.000	132.29	132.60 132.72	23 32	11.2133 12.1623	11.1901 12.1262	•21 •30
52	2546	1.000	598.150	3.000	132.29	132.80	38	13.1034	13.0558	•36
52	2547	1.000	623.150	3.000	132.29	132.94	49	14.0474	13.9798	.48
52	2548	1.000	369.850	3.500	154.34	154.88	35	4.2097	4.2084	.03
52	2549	1.000	373.150	3.500	154.34	154.34	.00	4.3878	4.3878	00
52	2550	1.000	398.150	3.500	154.34	153.78	•37	5.6739	5.6819	14
52	2551	1.000	423.150	3.500	154.34	153.99	•23	6.9174	6.9260	- .12
52	2552	1.000	448.150	3.500	154.34	154.25	•06	8.1404	8.1434	04
52	2553	1.000	473.150	3.500	154.34	154.49	10	9.3497	9.3427	•07
52 52	2554 2555	1.000	498 • 150 523 • 150	3.500 3.500	154.34 154.34	154.69 154.89	23 35	10.5481 11.7390	10.5282 11.7026	•19 •31
52	2556	1.000	548.150	3.500	154.34	155.07	47	12.9239	12.8676	.44
52	2557	1.000	573.150	3.500	154.34	155.20	55	14.1002	14.0245	• 54
52	2558	1.000	598.150	3.500	154.34	155.33	63	15.2713	15.1742	•64
52	2559	1.000	623.150	3.500	154.34	155.47	· 73	16.4411	16.3175	•76
52	2560	1.000	369.850	4.000	176.39	177.04	37	4.2404	4.2400	.01
52	2561	1.000	373.150	4.000	176.39	175.89	. 28	4.4488	4.4499	02
52 52	2562 2563	1.000	398.150	4.000	176.39	175.57	.47	5.9642	5.9746	17
52	2564	1.000 1.000	423.150 448.150	4.000 4.000	176.39	176.00	• 22	7.4470	7.4564	 13
52	2565	1.000	473.150	4.000	176.39 176.39	176.39 176.78	00 22	10.3773	8.9156 10.3588	•00 •18
52	2566	1.000	498.150	4.000	176.39	176.99	34	11.8249	11.7893	•30
52	2567	1.000	523.150	4.000	176.39	177.23	48	13.2688	13.2093	.45
52	2568	1.000	548.150	4.000	176.39	177.43	59	14.7061	14.6201	•59
52	2569	1.000	573.150	4.000	176.39	177.59	68	16.1355	16.0225	•71
52	2570	1.000	598.150	4.000	176.39	177.74	76	17.5605	17.4173	•82
52 52	2571	1.000	623.150	4.000	176.39		84	18.9818	18.8050	•94
52	2572 2573	1.000 1.000	369.850 373.150	4.500 4.500	198.44 198.44	195.20 195.26	1.66	4.2467	4.2470	01
52	2574	1.000	398.150	4.500	198.44	195.20	1.63 .93	4.4815 6.2288	4.4859 6.2518	10 37
52	2575	1.000	423.150	4.500	198.44	197.57	.44	7.9697	7.9914	 27

Table 7. (Continued)

10	Data Point	Weight	Temp.	Dens exp	t	Density	Density Diff.	Pexpt	Pcalc	Pressure
	No.		K	-mol/L	kg/m ³	kg/m ³	ial /o	MPa	MPa	,p
52 52 52 52 52 52 52 52 52 52 52 52 52 5	2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2600 2601 2602 2603 2604 2605 2606 2607 2608 2610 2611 2612 2613 2614 2615 2616 2617 2618 2620 2621 2622 2623 2624 2625	1.000 1.000	448.150 473.150 498.150 523.150 548.150 598.150 623.150 369.850 373.150 448.150 448.150 473.150 498.150 598.150 623.150 369.850 373.150 598.150 623.150 398.150 448.150 473.150 448.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 548.150 573.150 598.150 623.150 598.150 598.150 598.150 598.150 598.150 598.150 623.150 598.150	# 500 # 600 #	kg/m³ 198.44 198.44 198.44 198.44 198.44 198.44 198.44 198.44 198.44 20.49 220	kg/m³ 198.17 198.67 199.03 199.31 199.58 199.77 199.95 200.11 0.00 212.08 216.99 218.71 219.69 220.34 220.82 221.20 221.51 221.76 221.96 222.17 235.74 230.75 237.86 240.07 241.26 242.61 243.04 243.67 243.89 244.11 261.67 255.97 259.96 262.06 263.26 264.04 264.58 265.02 265.37 265.64 265.88 266.08	.1412304457677684 0.00 3.96 1.61 .81 .36 .07153246586676 2.88 5.11 1.97 1.03 .53 .20032135475665 1.11 3.36 1.78 .96 .50 .21 .001730404956 .78 1.60 1.26 .71 .35 .12	9.7057 11.4409 13.1699 14.8935 16.6146 18.3266 20.0345 21.7373 4.2471 4.5040 6.4948 8.5190 10.5551 12.5957 14.6367 16.6766 18.7128 20.7449 22.7683 24.7930 4.2476 4.5295 6.7960 9.1393 11.5115 13.8985 16.2915 18.6861 21.0802 23.4690 25.8510 28.2330 4.2564 4.5749 7.1710 9.8831 12.6421 15.4241 18.2157 21.0148 23.8137 26.6083 29.3984 32.1819 4.3046 4.6751 7.6783 10.8232 14.0320 17.2683	9.7160 11.4290 13.1321 14.8260 16.5114 18.1886 19.8581 21.5199 4.2475 4.5152 6.5427 8.5677 10.5885 12.6038 14.6128 16.6148 18.6095 20.5964 22.5754 24.5465 4.2481 4.5479 6.8693 9.2164 11.5721 13.9296 16.2850 18.6361 20.9811 23.3188 25.6486 27.9699 4.2593 4.5986 7.2607 9.9777 12.7167 15.4650 18.2159 20.9648 23.7088 26.4460 29.1748 31.8943 4.3135 4.7038 7.7722 10.9201 14.1022 17.3007	-11 -10 -29 -46 -63 -76 -89 1.01 -01 -25 -73 -57 -32 -06 -16 -37 -56 -72 -85 1.00 -01 -1.07 -84 -52 -02 -04 -27 -47 -64 -99 -07 -52 -1.23 -95 -00 -24 -61 -77 -90 -21 -61 -1.21 -89 -19
52 52 52 52 52	2626 2627 2628 2629	1.000 1.000 1.000	498.150 523.150 548.150 573.150	6.500 6.500 6.500	286.63 286.63 286.63	286.72 287.12 287.39 287.71	03 17 26 38	20.5151 23.7767 27.0311 30.2999	20.5054 23.7102 26.9107 30.1040	.05 .28 .45
52 52	2630 2631	1.000 1.000	598.150 623.150	6.500 6.500	286.63 286.63	287.89 288.06	44 50	33.5433 36.7846	33.2881 36.4616	.77 .89

Table 7. (Continued)

ID	Data Point	Weight	Temp.	Dens exp	†	Density calc kg/m ³	Density Diff.	Pexpt	Pcate	Pressure Diff.
	No.		K	mol/L	kg/m ³	kg/m ²	%	MPa	MPa	%
52 52	2632 2633	1.000	369.850 373.150	7.000 7.000	308.68 308.68	307.00 306.19	•55 •81	4.4573 4.8957	4.4755 4.9303	41 70
52 52	2634 2635	1.000 1.000	398.150 423.150	7.000 7.000	308.68 308.68	306.35 307.33	•76 •44	8.4013 12.0598	8.4904 12.1455	-1.05 71
52	2636	1.000	448.150	7.000	308.68	308.09	.19	15.7907	15.8436	33
52	2637	1.000	473.150	7.000	308.68	308.61	•02	19.5549	19.5630	04
52 52	2638 2639	1.000	498.150 523.150	7.000 7.000	308.68 308.68	308.97 309.23	09 18	23.3317 27.1102	23.2910 27.0197	•17 •34
52	2640	1.000	548.150	7.000	308.68	309.47	 26	30.8952	30.7437	•49
52	2641	1.000	573.150	7.000	308.68	309.74	34	34.6896	34.4593	•67
52	2642	1.000	598.150	7.000	308.68	309.90	39	38.4597	38.1639	•78
52 52	2643 2644	1.000 1.000	369.850 373.150	7.500 7.500	330.73 330.73	329.49 329.22	•37 •46	4.8221 5.3442	4.8512 5.3857	60 77
52	2645	1.000	398.150	7.500	330.73	329.36	•42	9.4625	9.5405	82
52	2646	1.000	423.150	7.500	330.73	330.03	•21	13.7340	13.7944	44
52	2647	1.000	448.150	7.500	330.73	330.42	• 09	18.0595	18.0953	20
52 52	2648 2649	1.000 1.000	473.150 498.150	7.500 7.500	330.73 330.73	330.87 331.13	04 12	22.4403 26.8214	22.4191 26.7514	•09 •26
52	2650	1.000	523.150	7.500	330.73	331.34	18	31.2082	31.0832	•40
52	2651	1.000	548.150	7.500	330.73	331.50	23	35.5902	35.4082	•51
52	2652	1.000	573.150	7.500	330.73	331.72	30	39.9842	39.7222	•66
52 52	2653 2654	1.000 1.000	369.850 373.150	8.000 8.000	352.78 352.78	351.87 351.84	•26 •27	5.5551 6.1798	5.5955 6.2259	72 74
52	2655	1.000	398.150	8.000	352.78	352.00	•22	11.0271	11.0931	59
52	2656	1.000	423.150	8.000	352.78	352.42	•10	16.0100	16.0528	27
52	2657	1.000	448.150	8.000	352.78	352.79	00	21.0590	21.0572	•01
52 52	2658 2659	1.000	473.150 498.150	8.000 8.000	352.78 352.78	353.03 353.20	07 12	26.1301 31.2060	26.0818 31.1118	•19 •30
52	2660	1.000	523.150	8.000	352.78	353.34	16	36.2829	36.1374	•40
52	2661	1.000	369.850	8.500	374.83	374.05	•21	6.8600	6.9189	85
52 52	2662	1.000	373.150	8.500	374.83	374.16 374.51	• 18	7.6085	7.6628 13.3719	 71
52	2663 2664	1.000 1.000	398.150 423.150	8.500 8.500	374.83 374.83	374.65	•09 •05	13.3324 19.1292	19.1583	30 15
52	2665	1.000	448.150	8.500	374.83	374.73	•02	24.9617	24.9806	08
52	2666	1.000	473.150	8.500	374.83	375.10	07	30.8828	30.8156	•22
52 52	2667 2668	1.000 1.000	498.150 369.850	8.500 9.000	374.83 396.87	375.19 396.40	10 .12	36.7519 9.0356	36.6491 9.0937	•28 - •64
52	2669	1.000	373.150	9.000	396.87	396.43	•12	9.0330	9.0957	 57
52	2670	1.000	398.150	9.000	396.87	396.94	02	16.6730	16.6617	•07
52	2671	1.000	423.150	9.000	396.87	396.82	-01	23.3965	23.4083	05
52 52	2672 2673	1.000 1.000	448.150 473.150	9.000 9.000	396.87 396.87	396.98 397.10	03 06	30.2048 37.0155	30.1757 36.9435	•10 •19
52	2674	1.000	369.850	9.500	418.92	418.79	•03	12.4364	12.4614	20
52	2675	1.000	373.150	9.500	418.92	418.99	02	13.5032	13.4902	•10
52	2676	1.000	398.150	9.500	418.92	418.85	•02	21.2979	21.3154	08
52 52	2677 2678	1.000 1.000	423.150 448.150	9.500 9.500	418.92 418.92	418.98 418.99	01 02	29.1850 37.0435	29.1674 37.0195	•06 •06
52	2679	1.000	369.850	10.000	440.97	440.96	•00	17.4363	17.4398	02
52	2680	1.000	373.150	10.000	440.97	440.91	•01	18.6257	18.6426	09
52	2681	1.000	398.150	10.000	440.97	441.11	03	27.8096	27.7624	•17
52 52	2682 2683	1.000	423.150 369.850	10.000 10.500	440.97 463.02	441.25 463.22	06 04	36.9863 24.6078	36.8764 24.5320	•30 •31
52	2684	1.000	373.150	10.500	463.02	463.28	06	26.0340	25.9316	•39
52	2685	1.000	398.150	10.500	463.02	463.33	07	36.6584	36.5180	•38
52	2686	1.000	369.850	11.000	485.07	485.50	09	34.5614	34.3368	•65
52	2687	1.000	373.150	11.000	485.07	485.54	10	36.2066	35.9576	•69

Table 8. Comparisons of data for ideal gas functions with eq (7).

Propane ideal gas functions from Chao, et al. [13]

Temp.	C _D ,	/R	Diff.	(H° -	HO)/RT	Diff.	S°/F	₹	Diff.
K	expt.	calc.	Z	expt.	calc.	%	expt.	calc.	Z
50.000 100.000	4.096 4.967	4.084 4.987	•296 - •409	4.014 4.254	4.013 4.254	•024 -•001	22.353 25.433	22.355 25.433	009
150.000	5.868	5.854	•230	4.645	4.647	 045	27.622	27.625	001 010
200.000	6.743	6.730	•201	5.059	5.056	.066	29.429	29.426	•011
273 • 150 298 • 150	8.268 8.852	8.289 8.874	250 246	5.707 5.946	5.706 5.947	•017 ••016	31.749 32.498	31.746 32.497	•008 •004
300.000	8.892	8.917	285	5.964	5.965	017	32.549	32.552	010
400.000 500.000	11.308 13.542	11.297 13.519	•089 •170	6.998 8.088	7.002 8.087	047 .011	35.442 38.210	35.444 38.208	006 .004
600.000	15.479	15.477	.014	9.162	9.159	•033	40.852	40.850	•004
700.000 800.000	17 • 160 18 • 614	17.172 18.634	070 103	10.188 11.152	10 • 186 11 • 153	•019 -•006	43.368 45.758	43.367 45.757	•003 •002
900.000	19.888	19.898	050	12.054	12.056	017	48.023	48.027	008
1000.000	21.000 21.971	20.996 21.957	•016 •063	12.894 13.677	12.896 13.677	015 003	50.182 52.230	50.182 52.229	•000 •002
1200.000	22.821	22.803	•081	14.404	14.403	•005	54.177	54.176	•002
1300.000	23.556 24.200	23.552 24.219	•018 - •076	15.080 15.709	15.079 15.708	•010 •007	56.034 57.801	56.032 57.802	•005 - •002
1500.000	24.764	24.219	210	16.294	16.296	008	59.491	59.494	 002

Number of points = 19; rms deviation for C_p^O = 0.19%; rms deviation for H^O = 0.03%; rms deviation for S^O = 0.006%.

Propane ideal gas specific heats

Table 8. (Continued)

Data sources and ID numbers: (2)A.P.I.44, (3)Beeck, (4)Sage, (5)Kistiakowsky/Lacher, (6)Kistiakowsky/Rice, (7)Dailey, (8)Ernst, (9)Rossini.

ID	Temp.	C	2/R	Diff.		
	К	expt.	calc.	%		
2	100.000	4.952	4.987	72		
2	298.150	8.842	8.874	36		
2	700.000	17.210	17.172	.22		
2	1000.000	21.050	20.996	•26		
3	273.150	7.770	8.289	-6.68		
3	373.150	10.135	10.665	-5.23		
3	473.150	12.420	12.947	-4.24		
3	573.150	14.433	14.978	-3.78		
2 2 2 3 3 3 3	294.300	8.817	8.783	•39		
4	310.900	9.088	9.177	97		
4	327.600	9.350	9.576	-2.42		
4	344.300	9.617	9.976	-3.74		
4	360.900	9.893	10.374	-4.85		
4	377.600	10.165	10.771	-5.96		
4	394.300	10.432	11.164	-7.02		
4	410.900	10.704	11.551	-7.91		
4	427.600	10.970	11.934	-8.78		
4	444.300	11.242	12.311	-9.51		
5	148.200	5.883	5.825	•99		
5	157.800	6.059	5.983	1.26		
5	213.100	7.045	6.986	•85		
5	219.000	7.131	7.105	•37		
5	258.000	7.926	7.944	22		
6	272.380	8.037	8.271	-2.92		
6	300.370	8.796	8.926	-1.47		
6	334.050	9.642	9.731	92		
6	368.550	10.487	10.556	65		
7	334.700	9.878	9.746	1.34		
7	360.100	10.236	10.354	-1.16		
7	387.800	10.875	11.012	-1.26		
7	452.600	12.616	12.496	•95		
7	521.000	14.035	13.953	•59		
7	562.000	14.644	14.765	83		
7	603.300	15.479	15.537	37		
7	693.200	16.918	17.065	86		
8	293.150	8.740	8.755	17		
8	313.150	9.154	9.230	 83		
8	333.150	9.658	9.709	- .53		
8	353.150	10.151	10.188	 37		
9	338.706	9.840	9.842	03		
9	352.594	10.186	10.175	-11		
9	366.483	10.528	10.507	•20		
9	380.372	10.869	10.836	•30		
9	394.261	11.206	11.163	•38		
9	408.150	11.537	11.487	•43		
9	422.039	11.857	11.807	•42		

Table 9. Interpolated ideal gas functions from eq (7).

Temp.	Eo	HO	so	CO	Co
K	J/mo!	J/mol	J/(mol•K)	J/(mol•K)	J/(mol•K)
80	2076.0	2741 • 1	202.599	29.75	38.07
90	2382.1	3130.4	207.182	31 • 48	39.79
100	2705 • 3	3536 •8	211.461	33.15	41.47
110	3044.8	3959.4	215.488	34.73	43.04
120	3399.6	4397.3	219.297	36.21	44.53
130 140	3768.9 4152.0	4849.7 5316.0	222.918 226.373	37.63 39.00	45.94 47.31
150	4548.8	5796.0	229.683	40.36	48.67
160	4959.3	6289.6	232.868	41.73	50.05
170	5383.5	6797.0	235.944	43.13	51.45
180	5822.1	7318.7	238.925	44.58	52.90
190	6275.3	7855.1	241.825	46.08	54.40
200	6743.9	8406.8	244.654	47.64	55.95
210	7228.3	8974.3	247.423	49.25	57.57
220	7729•2	9558.3	250.139	50.93	59.24
230	8247.0	10159.3	252.811	52.65	60.97
240	8782.4	10777.8	255.443	54.43	62.74
250	9335.7 9907.4	11414.3	258.041	56.25	64.56
260 270	10497.9	12069•1 12742•8	260.609 263.151	58 .11 60 . 00	66•42 68•31
280	11107.5	13435.5	265.670	61.92	70.23
290	11736.4	14147.5	268.168	63.86	72.18
300	12384.8	14879.1	270.648	65.83	74.14
310	13053.0	15630.4	273.112	67.80	76.12
320	13740.9	16401.5	275.560	69.79	78.11
330	14448.8	17192.5	277.994	71 • 78	80.10
340	15176.6	18003.5	280.414	73.78	82.09
350	15924.3	18834.4	282.823	75.77	84.08
360	16692.0	19685.1	285.219	77.76	86.07
370 380	17479•4 18286•7	20555.7 21446.1	287.605 289.979	79.74 81.71	88.05 90.02
390	19113.6	22356.2	292.343	83.67	91.98
400	19960.0	23285.8	294.696	85.62	93.93
410	20825.9	24234.7	297.039	87.55	95.86
420	21710.9	25203.0	299.372	89.46	97.78
430	22615.1	26190.3	301.695	91.36	99.68
440	23538.1	27196.4	304.008	93.24	101.56
450	24479.9	28221.3	306.312	95.10	103.42
460	25440 •1	29264.7	308.605	96.94	105.26
470	26418.6	30326.4	310.888	98.76	107.07
480	27415.2	31406.1	313.161	100.56	108.87
490 500	28429.7 29461.8	32503.7 33619.0	315.424 317.677	102.33 104.09	110.65 112.40
510	30511.3	34751.6	319.920	105.82	114.13
520	31578.0	35901.5	322.153	107.52	115.84
530	32661.7	37068.3	324.375	109.21	117.52
540	33762 • 1	38251.9	326.588	110.87	119.19
550	34879.1	39451.9	328.790	112.51	120.82
560	36012.3	40668.3	330.981	114.13	122.44
570	37161.5	41900.7	333.163	115.72	124.04
580	38326.6	43148.9	335.334	117.29	125.61
590 600	39507•3 40703•4	44412.8 45692.0	337 • 494 339 • 644	118.84 120.37	127.16 128.68
610	41914.6	46986.3	341.783	121.87	130.19
620	43140.7	48295.6	343.912	123.36	131.67
630	44381.6	49619.7	346.031	124.82	133.13
640	45637.0	50958.2	348.139	126.26	134.57
650	46906.7	52311.0	350.236	127.67	135.99

Table 10. Comparisons of heat of vaporization data with eq (9).

Data sources and ID numbers: (1)Dana, (2)Kemp, (3)Sage, (4)Staveley, (5)Helgeson, (6)Yesavage, (7)Carruth, (40)Thermal Loops, (41)Clapeyron.

	(5)Heigeson, (6) resavage, (/)Carruii	1, (40) merma	1 Loops, (41)Cla	peyron.
10	Weight	Temp.	Heat of Va	aporization	Diff.
10		K		/mol	%
		• •	expt.	calc.	70
4.0	1 000	05 470			0.7
40	1.000	85.470	24.824	24.841	07
40	.999	90.000	24.622	24.628	02
40	•997	95.000	24.401	24.398	•01
40	•995	100.000	24.183	24.172	•04
40	.993	105.000	23.967	23.952	.06
40	•992	110.000	23.754	23.735	•08
7	.991	110.946	23.719	23.695	•10
40	.990	115.000	23.544	23.522	•09
7	.988	118.342	23.391	23.382	•04
40	•988	120.000	23.335	23.313	•09
40	•986	125.000	23.129	23.107	•09
7	•985	125.739	23.068	23.077	04
40	•983	130.000	22.925	22.904	• 09
7	•982	133.135	22.770	22.778	03
40	•981	135.000	22.722	22.703	•08
40	.979	140.000	22.520	22.504	•07
7	.979	140.532	22.460	22.483	10
40	.976	145.000	22.320	22.307	•06
7	.975	147.928	22.182	22.192	05
40	.974	150.000	22.121	22.111	.05
40	.971	155.000	21.923	21.916	.03
7	.971	155.324	21.887	21.903	07
40	.969	160.000	21.725	21.721	•02
7	.967	162.721	21.631	21.616	•07
40	•966	165.000	21.528	21.527	•01
40	.963	170.000	21.331	21.332	01
7	.963	170.117	21.326	21.328	01
40	.960	175.000	21.133	21.137	02
7	•958	177.514	20.989	21.038	23
40	.956	180.000	20.935	20.940	03
7	•953	184.910	20.745	20.746	00
40	•953	185.000	20.736	20.742	03
40	•949	190.000	20.536	20.543	03
7	.947	192.306	20.459	20.450	•05
40	•945	195.000	20.334	20.340	03
7	•942	199.703	20.144	20.148	02
40	.941	200.000	20.129	20.135	03
40	•937	205.000	19.922	19.927	03
7	0.000	207.099	20.014	19.839	•88
40	•933	210.000	19.712	19.716	02
7	•928	214.496	19.504	19.522	09
40	•928	215.000	19.498	19.500	01
40	.923	220.000	19.490	19.279	•01
7	.921	221.892	19.200	19.194	03
40	•921	225.000	19.057	19.053	•02
7	.912			18.855	
40	.912	229.288	18.857		•01
40	.912	230.000	18.830	18.822	•04
7		231.000	18.783	18.775	- 03
	. 903	236.685	18.500	18.503	02 - 27
41	• 998	90.000	24.562	24.628	27
41	•995	100.000	24.157	24.172	06
41	•991	110.000	23.744	23.735	•04
41	•986	120.000	23.328	23.313	•06
41	•982	130.000	22.914	22.904	•04
41	.977	140.000	22.504	22.504	00
41	•971	150.000	22.100	22.111	05
41	•965	160.000	21.703	21.721	08
41	•959	170.000	21.310	21.332	10
41	•951	180.000	20.918	20.940	10
41	•944	190.000	20.525	20.543	09
41	• 935	200.000	20.124	20.135	06
41	•925	210.000	19.713	19.716	01
41	.914	220.000	19.285	19.279	•03

Table 10. (Continued).

Data Sources and ID numbers: (1)Dana, (2)Kemp, (3)Sage, (4)Staveley,
(5)Helgeson, (6)Yesavage, (7)Carruth, (40)Thermal Loops, (41)Clapeyron.

	(5) hergeson,	(6) lesavage, (/) call ulli,	(40) [[[]	al Loops, (41)Clap	eyron.
ID	Weight	Temp. K		Vaporization J/mol	Diff.
		N	expt.	calc.	/0
41 41 41 41 41 41 41 41 41 41	.902 .888 .872 .853 .831 .805 .774 .736 .687 .625 .541 .426 .264	230.000 240.000 250.000 260.000 270.000 280.000 290.000 310.000 320.000 330.000 340.000 350.000 360.000	18.837 18.362 17.855 17.310 16.720 16.078 15.377 14.608 13.757 12.808 11.733 10.480 8.941 6.821	18.822 18.340 17.829 17.283 16.696 16.062 15.372 14.614 13.775 12.834 11.760 10.499 8.946 6.806	.08 .12 .14 .15 .14 .10 .04 04 13 20 23 19
1111111111112333333333333333333445555666666666666666	0.000 0.000	234.070 237.750 241.830 247.100 253.740 261.210 269.100 275.420 279.890 281.850 285.530 287.150 292.200 292.700 231.090 312.817 312.983 316.206 316.372 316.483 316.539 318.928 320.983 321.150 327.983 321.150 327.983 328.094 335.594 335.650 345.706 346.039 348.150 185.000 213.200 310.928 322.039 327.594 330.372 231.094 263.206 285.928 301.317 313.428 323.428 331.817 339.483 346.206 355.928 301.317 313.428 323.428 331.817 339.483 346.206 355.428 358.039 363.372 367.039	18.441 17.856 18.242 17.873 17.819 17.397 16.865 16.330 16.524 15.814 15.738 15.795 15.356 15.596 18.780 13.627 13.649 13.360 13.551 13.282 13.171 13.127 13.143 12.284 12.224 11.297 11.344 10.205 10.188 9.648 20.690 19.660 13.651 12.592 11.989 11.612 18.778 17.148 15.7734 14.617 13.633 12.649 11.624 10.578 9.512 8.405 7.216 5.873 4.449	18.629 18.451 18.249 17.981 17.629 17.214 16.751 16.359 16.069 15.939 15.688 15.575 15.211 15.174 18.771 13.521 13.506 13.204 13.189 13.178 13.178 13.173 12.940 12.735 12.718 11.989 11.977 11.082 11.075 9.660 9.607 9.264 20.742 19.578 13.692 12.627 12.033 11.717 18.771 17.100 15.660 14.508 13.465 12.483 11.547 10.570 9.581 8.500 7.304 5.787 4.198	-1.01 -3.220460 1.08 1.06 .6818 2.8378 .32 1.41 .95 2.78 .05 .78 1.06 1.18 2.75 2.83 .83 1.78 3.08 3.34 2.46 2.07 1.94 2.43 5.64 6.04 4.152530283689 .04283689 .04283775 1.25 1.33 .677772 -1.12 -1.20 1.49 5.99

Number of data points used in fit = 76; rms deviation = 0.083%.

Table 11. Enthalpies of saturated liquid propane from eq (10).

Temp. K	H o 1	H _σ (eq (10)) J/mol	Diff.
90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 310.00 310.00 310.00 330.00 340.00 350.00	391.6 1253.4 2113.2 2973.0 3834.6 4700.4 5572.6 6453.6 7345.6 8250.5 9170.5 10106.9 11061.1 12034.5 13028.3 14043.7 15082.5 16145.6 17235.5 18354.0 19504.4 20690.5 21918.3 23196.1 24537.1 25963.5 27517.5 29314.7	391.5 1253.4 2113.3 2973.0 3834.5 4700.3 5572.6 6453.7 7345.7 8250.7 9170.5 10106.8 11060.9 12034.3 13028.2 14043.9 15082.6 16145.9 17235.6 18353.9 19504.1 20690.3 21918.2 23196.4 24537.6 25963.4 27516.8	*** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *
369.85	33082.2	33082.2	0.000

Number of points = 28; rms deviation = 0.004%.

 $^{^{\}rm 1}$ Derived from ideal gas functions, the equation of state, and the formulated heats of vaporization.

Table 12. Entropies and specific heats of saturated liquid propane from eq (11).

Temp. K	S	S _σ (eq ()) J/(mol•K)	Diff.	C _σ J/(mol•K)
	82.561 87.074 96.197 104.394 111.864 118.753 125.165 131.185 136.877 142.292 147.471 152.448 157.251 161.902 166.421 170.824 175.126 179.339 183.476 187.548 191.566 195.544 199.496 203.440			
320.00 330.00 340.00 350.00 360.00 369.85	207.401 211.412 215.532 219.870 224.725 234.726	207.401 211.415 215.533 219.867 224.727 234.726	000 001 001 002 001 0.000	127.39 133.79 142.79 157.85 194.14

Number of points = 28; rms deviation = 0.001%.

 $^{^{\}mbox{\scriptsize 1}}$ Derived from ideal gas functions, equation of state, and formulated heats of vaporization.

Data sources and ID numbers: (16)Sliwinski; (20)Haynes, Saturated liquid; (XXXX)Haynes, Compressed liquid. Table 13. Comparisons of dielectric constant data with eq (12)

4	- 88	.005	4004	1.004	0000	600°-	•016	•004	*017	-008	•071	.023	039	058	037	052	900*-	063	044	°019	•008	•002	*003	000*-	003	003	007	004	005	003	000	•005	.020	.027	.031	•022	150.	•016	016	.012	010	•008	000	400	>
+	calc	1.01990	1.03529	1.07155	1.09510	1.11225	1.13591	1.15336	1.18130	1.20279	1.35144	1.38688	1.41115	1.44663	1.47525	1.52009	1.58830	1.61732	1.66863	1.65078	1.66335	1.66781	1.67555	1.68741	1.69898	1.71029	1.72136	1.73222	1.74289	1.75340	1.76375	1.77397	1.78408	1.79407	1.80397	1.80713	1.81580	1.82355	1.83324	1 .84 289	1.85250	1.86207	1.87162	1.89068)
+	expt	1.01995	1.04280	1.07150	1.09510	1.11215	1.13610	1.15340	1,18150	1.20270	1.35240	1.38720	1 • 4 1060	1.44580	1.47470	1.51930	1.58820	1.61630	1.66790	1.65110	1.66348	1.66789	1.67559	1.68741	1.69893	1.71023	1.72124	1.73216	1.74281	1.75335	1.76375	1.77401	1.78443	1 • 7 94 56	1.80454	1.80752	1.81456	1.82385	1.83353	1.84312	1.85268	1.86222	1.87179	1.89086)
77:0) - 86	.252	125	063	•003	060	.131	.025	• 106	042	.245	•073	118	 162	100	130	014	137	089	040	•016	010	•002	000*-	900	900*-	013	007	600	005	-000	•004	•036	.048	•056	.038	•054	• 028	.027	•021	•017	.014	015	015)
ction	calc	16.010	16.010	16.034	16.053	16.066	16.084	16.096	16,113	16.125	16,162	16,161	16.159	16.154	16.148	16.135	16,111	16,100	16.078	16.086	16.080	16.078	16.075	16.070	16.064	16.059	16.054	16.049	16,045	16.040	16.036	16.031	16.027	16.023	16.019	16.018	16.015	16.011	16.008	16.004	16.001	15.998	15.995	15,990	1
C-M Function	expt	16.050	15 086	16.024	16.053	16.052	16.105	16.100	16.130	16.118	16.202	16.173	16.140	16,128	16,131	16,114	16 • 109	16.078	16.063	16.092	16.083	16.080	16.076	16.070	16,063	16.058	16.052	16.048	16.043	16.039	16.035	16.032	16.033	16.031	16.028	16.024	10.024	16.016	16.012	16.008	16.004	16.000	15,998	15,993	,
-	mo1/L		0000 0000	1.453	1.914	2.245	2.695	3.022	3.537	3.927	6.488	7.068	7.459	8.022	8.469	9.157	10.176	10.600	11.336	11.082	11.261	11.324	11.434	11.601	11.763	11,921	12.074	12.224	12.371	12.514	12.655	12.793	12,929	13.062	13,194	15.256	15.524	13.452	13.579	15.705	13.829	13.952	14.075	14.317	1
4	kg/m3 r	18.15	50°.25	64.06	84.40	00°66	118.83	133.24	155.96	173.15	286.10	311.68	328.92	353.75	373.46	405.80	448.73	467.43	499.89	488.67	496.57	499°36	504.19	511.57	518.72	525.67	532.44	539.05	545.50	551.83	558°03	564 . 12	570.11	576.01	581.81	585.66	28/022	595.21	598.80	604.34	609.83	615.26	620.66	631.32	
	MPa	.8374	1.5685	2.5815	3,1253	3.4292	3.7573	3.9307	4.1129	4.1886	4.1129	3.9307	3.7573	3.4292	3,1253	2.5815	1.7120	1.3685	.8374	8266°	.8781	.8374	.7692	•6706	.5817	.5018	.4304	• 3668	.3106	.2611	•2178	. 1802	.1478	.1201	9960°	6680°	60/0	•0605	.0469	•0559	.0271	.0201	.014/ 0105	0074	
1	**************************************	293-190	515,120	343.080	353.090	358.100	363.110	365,600	368.100	369.100	368.100	365.600	363.110	358 . 100	353.090	545.080	323.120	313.120	293.190	300.000	295.000	293 . 190	290.000	285.000	280.000	275.000	270.000	265.000	260.000	255.000	250.000	245.000	240.000	255.000	250.000	228.400	000°677	220.000	215,000	210.000	205.000	200.000	195.000	185.000	
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		1.000	1.000	000	1.000	1.000	1.000	1.000	1.000	000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0000	000.	000	000	0000	000	000	000	000	000	1.000	
2	<u> </u>	16	0 4	16	16	16	16	16	16	16	16	91	9 :	9	9 ;	9 :	9	16	16	20	20	20	20	20	20	20	20	20	20	20	20	20	20	07	07	200	0.7	2 5	20	0 6	07	070	200	20	

Table 13. (Continued)

010 000 000 000 000 000 001 001 0020 0020 -.019 -.019 1.90976 1.91931 1.92890 1.94816 1.94816 1.96762 1.96737 2.00737 2.00782 2.03822 2.04877 2.04877 2.05947 2.05947 2.10008 2.09837 2.09666 2.09490 2.09309 2.09118 2.08927 2.08732 2.08736 2.08736 2.08018 2.07780 2.07561 2.07564 2.06964 2.06596 2.06593 2.06593 2.06503 2.06503 Dielectric Constant .90021 Data sources and ID numbers: (16)Sliwinski; (20)Haynes, Saturated Liquid; (XXXX)Haynes, Compressed Liquid. 1.99038 1.99990 1.91946 1.92898 1.954814 1.95752 1.96752 1.98721 1.99715 2.00718 2.00718 2.02759 2.02759 2.02759 2.02759 2.10039 2.09864 2.09686 2.09504 2.09325 2.09140 2.08955 2.0877 2.08577 2.08384 2.08010 2.07785 2.07576 2.07384 2.07190 2.06992 2.06793 2.06631 2.06468 2.06304 2.06053 2.05749 2,05964 expt .014 .012 .007 .007 .005 .005 .008 .009 .009 .009 .009 .009 028 0028 0019 0019 0019 0019 0028 15.988 15.986 15.983 15.983 15.983 15.981 15.981 15.988 15.988 15.989 15.989 15.999 15.999 16.005 16.005 5.972 15.976 15.988 15.998 15.999 16.000 16.015 5.948 calc C-M Function cm3/mol 15.990 15.988 15.988 15.983 15.980 15.980 15.980 15.981 15.981 15.983 15 16.006 16.014 16.023 15.975 15.983 15.987 15.992 15.997 16.003 16.014 15.951 15.961 15.967 15.978 15.983 15.983 15.993 17.993 14.436 14.556 14.556 14.792 14.910 15.027 15.261 15.377 15.610 15.726 15.842 15.958 16.190 16.307 16.423 16.540 16.799 16.751 16.751 16.701 16.675 16.648 16.594 16.567 16.594 16.561 16.553 16.476 16.420 16.397 16.397 16.338 16.338 16.376 16.347 16.318 mol/L Density kg/m3 636.60 641.86 657.09 652.30 657.48 667.81 672.96 678.09 683.22 683.22 683.22 678.09 778.09 778.82 778.82 778.82 778.82 740.78 739.73 738.67 737.59 735.31 735.31 734.15 732.96 731.76 731°74 730°28 728°94 727°74 725°29 724°05 723°04 723°04 720°46 Pressure 34.7214 31.2781 27.8346 24.3913 20.9479 17.5048 14.0615 10.6186 7.1754 3.7326 35.7539 31.6219 27.8341 24.3910 20.9477 17.5047 14.0615 .0050 .0034 .0034 .0002 .0001 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 8.5527 5.7985 3.7328 1.6670 180.000 175.000 165.000 165.000 155.000 145.000 145.000 125.000 125.000 120.000 110.000 110.000 100.000 990.000 110.000 Weight 314 353 395 444 497 558 626 702 787 883 304 344 444 444 497 558 626 626 824 883 946 201 202 203 203 1204 1205 206 207 208 209 209 0001 0003 0004 0005 0005 0007 0009 0010 0011

Table 13. (Continued)

.014 .002 .002 .002 .004 .004 .008 .0022 .0015 .0007 .0002 2.03649 2.03420 2.03191 2.02954 2.02730 2.02551 2.02551 2.02154 2.021696 2.01896 2.01896 2.01896 2.01984 2.01747 2.01500 2.01258 2.00716 2.00518 2.05368 2.05155 2.04944 2.04737 2.04571 2.04114 2.03998 2.03917 2.03882 2.00309 2.00135 2.00010 1.99894 1.99803 1.99803 Dielectric Constant .00261 .99957 .99653 2.04236 2,02242 2,04193 2,03913 .00564 Data sources and ID numbers: (16)Sliwinskl; (20)Haynes, Saturated liquid; (XXXX)Haynes, Compressed liquid. 2.05133 2.02936 2.02717 2.02541 2.02333 2.02142 2.01997 2.01875 2.01876 2.02218 2.01961 2.01731 2.01488 2.01249 2.00722 2.00521 2.00521 2.00129 .99825 .99787 .99763 2.04575 2.04228 2.04103 2.03982 2.03900 2.03861 2.04135 2.03863 2.03604 2.03384 2.03162 .99939 .99639 2.05340 2.04740 .99877 .00519 expt - 0015 -.033 -.022 -.013 -.011 5.970 5.974 5.974 5.982 5.984 5.986 5,928 5,934 5,939 5,945 5,945 5,945 5,945 5,945 5,945 5,945 5,945 5,945 5,985 5.945 5.945 5.950 5.950 5.961 5.961 5.921 5.928 15.934 15.941 15.947 calc C-M Function cm3/mol 5.955 15.925 15.931 15.937 15.943 15.963 15.967 15.974 15.976 15.978 15.978 15.978 15.978 15.978 15.978 15.978 15.978 15.978 5.925 5.924 5.932 5.939 5.946 5.916 expt 16.041 15.977 15.923 15.897 15.887 15.862 15.853 5.958 5.922 5.922 5.889 5.855 5.855 5.650 5.650 5.650 5.652 5.652 5.650 16.288 16.259 16.229 16.201 16.178 16.155 16.131 16.098 16.087 16.180 16.141 16.104 16.073 5.769 5.727 5.684 5.642 5.605 mol/L Density kg/m3 718.26 715.96 715.67 714.41 713.39 712.39 7711.35 7710.60 709.89 713.50 711.78 710.16 708.76 707.36 705.91 704.54 703.45 703.45 703.05 699.45 699.08 703.72 702.13 700.68 699.16 697.68 694.37 709.18 691.88 690.82 690.05 689.34 689.02 688.79 Pressure MPa 5.7991 3.7334 2.0118 1.1512 35.3418 31.4162 27.9727 24.3917 20.9484 13.5113 10.7569 7.8647 5.4548 3.7333 2.1495 1.4609 .9789 24.3900 20.9466 17.6413 14.5424 11.9258 9.2401 6.4857 4.5578 1.4591 .8761 36.3748 31.9673 27.8350 24.3919 20.9485 17.5053 14.1999 11.5833 8.5533 36.7881 32.6560 28.5239 24.3920 20.9487 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 130 000 130 000 130 000 130 000 130 000 130 000 130 000 130 000 130 000 140.000 140.000 140.000 140.000 Weight 444 497 555 616 672 735 859 859 859 914 953 297 395 395 395 395 443 443 680 680 680 680 883 883 935 980 980 308 351 351 351 444 444 444 637 637 637 637 952 952 968 293 337 386 443 497 602 602 603 604 605 606 607 607 608 610 611 401 402 403 404 405 405 407 408 412 412 413 701 702 703 704 705 \Box

Table 13. (Continued)

0000 0000 0000 0000 0000 0000 0000 .94213 .94052 .93949 1.99123 1.98873 1.98660 98438 98263 98093 97961 97884 97042 96688 96352 96067 95782 95484 95177 .94412 .93799 .93430 .93643 .92657 .91923 .91579 .91579 .90442 .90207 .90131 89633 .94672 90006 .88853 .88022 87330 ,90372 Dielectric Constant Data sources and ID numbers: (16)Sliwinski; (20)Haynes, Saturated liquid; (XXXX)Haynes, Compressed liquid. .99126 .98884 .98675 .98277 .98099 .97958 .97872 .94416 .94219 .94053 .96685 .96350 .96066 .95774 .95174 .95174 .91929 .91586 .91291 .90996 .90465 .90230 .90150 .90267 .89915 .89554 .89182 .93803 .93434 .93057 .92671 .88800 .87998 0002 0012 0016 0011 0004 - 0002 - 0002 - 0002 - 0005 - 0002 - 0003 - -.090 -.080 -.058 -.058 -.032 -.032 -.013 5.919 5.926 5.933 5.933 5.944 5.956 5.956 5.956 5.956 5.975 5.975 5.975 5.975 5.975 5.918 5.926 5.927 5.940 5.948 5.954 5.966 5.971 5.952 5.957 5.957 5.974 5.974 5.974 5.977 5.981 5.985 5.986 5.927 5.934 5.934 5.954 5.954 5.968 5.968 5.968 C-M Function cm3/mol 15.953 15.959 15.959 15.975 15.976 15.977 15.976 5.918 5.926 5.933 5.933 5.956 5.956 5.956 5.956 5.956 15.976 15.978 15.981 5.919 5.926 5.926 5.942 5.948 5.948 5.948 5.948 5.948 5.913 5.921 5.920 5.938 5.947 5.956 5.972 5.978 5.984 5.988 5.989 15.569 15.534 15.504 15.474 15.426 15.407 15.397 15.389 5.354 5.304 5.258 5.258 5.178 5.094 5.059 5.024 4.988 4.960 4.938 4.965 4.858 4.804 4.749 4.701 4.653 4.613 4.571 4.528 4.462 4.462 14.378 14.265 14.206 14.158 mo I/L 4.535 4.431 Density kg/m3 659.70 658.72 658.08 659.84 657.56 655.21 652.80 650.40 648.28 646.17 644.37 642.53 640.64 686.53 683.70 683.34 681.27 681.27 680.23 679.42 678.95 677.06 674.88 672.82 671.06 669.31 667.48 665.60 664.06 662.51 637.75 640.95 638.70 636.38 626.45 624.33 622.19 Pressure 6.6255 4.4221 2.7005 1.6676 36.4438 31.9674 27.8352 24.3921 17.5056 11.5050 8.5534 3.7335 2.0119 .9791 37.4764 35.3443 29.2121 25.0803 20.9483 17.5052 14.1308 11.3076 11.3076 5.7988 3.7330 1.6671 34.7203 31.2770 27.8334 24.3903 20.9469 17.5038 17.5056 14.3378 11.6523 8.8977 14.0606 11.3062 8.5516 160.000 160.000 160.000 160.000 160.000 160.000 160.000 180.000 180.000 180.000 180.000 180.000 180.000 180.000 200.000 200.000 200.000 200.000 200.000 140.000 140.000 140.000 140.000 140.000 140.000 140.000 200.000 Weight 558 620 620 673 743 862 863 863 946 946 287 328 378 433 624 624 624 624 636 837 883 946 968 314 353 353 353 353 444 497 497 558 626 686 901 902 903 904 905 906 907 908 910 912 2902 2903 2904 2905 2906 2907 2908

Data sources and ID numbers: (16)Sliwinski; (20)Haynes, Saturated Liquid; (XXXX)Haynes, Compressed Liquid. Table 13. (Continued)

Diff.	1.006	023	008	012	023	600	004	-,003	~.051	032	0000	007	-°007	013	01001	600	007	-018	011	005	1.000	000	•002	005	- 008	200-	013	016	016	025	013
Constant	1.86974 1.86702 1.86431	1.87171	1.85900	1.85017	1.84553	1.83724	1.83291	1.82961	1.84137	1.83647	1.82644	1.82125	1.81592	1.81043	1 80084	1.79570	1.79162	1.80963	1.80432	1.79880	1.79423	1.78459	1.77954	1.77431	1.76874	1.76432	1.75500	1.75001	1.74649	1.78688	1.77493
Dielectric	1.86963 1.86687 1.86408	1.87128	1.85886	1.84988	1.84511	1.83707	1.83284	1.82956	1.84043	1.83587	1,82626	1.82113	1.81579	1.81020	1.80062	1.79554	1.79150	1-80931	1.80412	1.79871	1.79421	1.78465	1.77957	1.77423	1.76860	1.76420	1.75478	1.74973	1.74621	1.78643	1.77470
	010	038	012	020	039	016	900	005	087	056	052	012	012	023	023	016	012	-032	- 019	600*-	002	900	.003	600*-	-015	013	023	029	030	045	024
ction mol calc	15.986 15.990 15.995	15.935	15.956	15.971	15.978	15.991	15.997	16.007	15.943	15.951	15,967	15.974	15,982	15.990	16.004	16.011	16.017	15.955	15,963	15.971	15.977	15,991	15,998	16.005	16.012	16.018	16.030		16.040	15.963	15.980
C-M Function cm3/mol expt ca	15.984 15.988 15.991	15.929	15.954	15.966	15.972	15.983	15,996	16.002	15.929	15.942	15.964	15.972	15.980	15.987	16,001	16.009	16.015	15.950	15,960	15.969	15.977	15.992	15.998	16.003	16.010	16.016	16.026	16.031	16.036	15.956	15.976
1 ty mol/L	14.060 14.022 13.984	14.129	13.950	13.826	13.761	13.645	13.584	13.490	13.738		13.527			13,301	13.166	13.093	13.035	13,320		13,166	13.101	12,964	12.893	12.818	°73		12,543	12.472		13.017	12.846
Density kg/m3	619.99 618.32 616.64	623.05	615.17	609.70	606.82	601.69	599.00	596.96 594.88	605.80	602.75	596.51	593.28	589.95	586.54 504	580.56	577.36	574.82	587.38	584.05	580.60	577.73	571.69	568.52	565.25	561.75	558.98 556.00	553.12	549.98	547.77	574.00	566.49
Pressure MPa	5.7974 3.7317 1.6657	34.7208	24.3908	17.5043	14.0610	8.5521	5.7979	5.7521 1.6662	34.7217	31.2784	24.3916	20.9482	17.5052	14.0619	8.5530	5.7988	3.7331	34.7213	31.2780	27.8346	25.0801	19.5709	6.8	14.0619	11.3076	9.241/	5.1103	3.0445	1,6673	34.7209	27.8341
Temp. K	200.000	220.000	220.000	220.000	220.000	220.000	220,000	220.000	240,000	240.000		240.000	240,000	240.000	240.000	240.000	240.000 240.000	260.000	260,000	260.000	260.000	260.000	260,000	260.000	260.000	260.000	260.000	260.000	260.000	275.000	275.000
Weight	.824 .883 .946	.353	444	.558	.626	.752	.824	.946	.314	.353	444	.497	. 558	.626 686	.752	.824		.314	.353	.395	.455	. 521	.571	• 626	989	787	.843	.903	. 946	.353	265.
QI	2910 2911 2912	3001	3004	3005	3007 3008	3009	3010	5011	3101	3102	3104	3105	3106	3107	3109	3110	3111	3201	3202	3203	3204	3206	3207	3208	5209	3210	3212	3213	5214	3301 3302	5505

Table 13. (Continued)

Data sources and ID numbers: (16)Sliwinski; (20)Haynes, Saturated Liquid; (XXXX)Haynes, Compressed Liquid.

ni ff.	52	008	001	2005	012	024	028	026	022	012	008	-043	010	.025	.032	.038	0.045	.043	.036	.029	.018	900°	*008	.010	000°	.011	,018	0.034	.032	,030	.033	.041	.045	.038	.029	440.	0000	.022	
Constant	calc	1.76984	1./6444	1.75320	1.74725	1.74097	1.73590	1.73044	1.72461	1.71938	1.71398	1,76357	1.75699	1.75021	1.74448	1.73847	1.73214	1.72555	1.71862	1.71116	1.70528	1.69896	1.69200	1.68571	,) a	1.74825	1.74138	1.73395	1.72792	1.72157	1.71474	1.70734	1.69950	1.69117	1.68447	1.67683	1.66330	1.65710	1
Dielectric	expt	1.76970	1./6442	1.75316	1.74705	1.74055	1.73542	1 • 72999	1.72424	1,71918	1.71384	1.76432	1 - 75732	1.75065	1 .74504	1.73913	1.73292	1.72629	1.71924	1,7!166	1.70559	1.69910	1.69214	1,68583	1.675	1.74844	1 • 74 169	1.73454	1.72847	1.72208	1.71530	1.70804	1.70026	1.69181	1.68497	1.67757	CCK00-1	1.65746	h
niff.	. 8e	014	7007	-004	022	046	053	050	041	022	016	.078	.035	.046	090	.072	.086	. 082	690°	,057	•036	•017	.016	020	.001	.021	.033	•064	•061	•057	•064	080	.088	•075	.059	060.	.00.0	0.045	
nction (mol	calc	15.987	15.994	16-008	16.016	16.024	16.030	16.036	16.043	16.049	16.055	15,972	15,981	15,990	15,997	16.005	16.012	16.020	16.029	16.037	16.044	16.051	16.058	16.065	16.071	15.979	15,987	15.997	16,004	16.012	16.020	16.028	16.037	16.046	16.053	16.061	16.074	16.080	
C-M Function	expt	15.984	15.995	16,008	16.013	16.016	16.021	16.028	16.036	16.045	16.053	15.985	15,987	15,997	16.007	16.016	16.026	16.034	16.040	16.046	16.049	16.053	16.061	16.058	16.071	15.982	15.993	16,007	16.014	16.021	16.030	16.041	16.051	16.058	16.062	16.075	16.082	16.087	
. }	, mo1/L	12,774	12.69/	12.536	12,451	12,361	12,288	12.210	12,127	12.051	11.974	12,702	12,608	12,511	12.428	12,342	12.251	12,156	12.057	11.949	11.864	11.773	11.672	11.581	11.486	12,493	12,395	12,288	12,201	12,109	12.011	11.904	11.790	11.670	11.573	11.462	11.265	11.174	
Dens	kg/m3 m	563.28	559.89	552.80	549.05	545.09	541.88	538.43	534.74	531.43	528.01	560-13	555.97	551.69	548 °06	544.25	540.24	536.06	531.66	526.92	523.17	519,15	514.71	510.69	506.50	550.92	546.57	541.86	538.02	533,99	529.64	524.93	519.92	514.61	510.32	505.42	496-73	492.75	
Pressure		25.0796	10 5704	16.8157	14.0612	11,3070	9.2410	7.1752	5.1095	3,3880	1.6665	34.7213	31.2781	27.8346	25.0802	22,3255	19.5710	16.8164	14.0622	11.3077	9.2418	7,1761	5.1104	3.3888	1.6674	34.7209	31.2776	27.8341	25.0795	22.3248	19.5703	16.8157	14.0613	11.3070	9.2410	/•1/52 F 100E	3,7324	2.3551	
Temp	×	275.000	2/5.000	275-000	275.000	275,000	275.000	275,000	275,000	275.000	275,000	290,000	290,000	290,000	290,000	290.000	290,000	290,000	290.000	290.000	290 000	290.000	290.000	290 • 000	290.000	300,000	300.000	300.000	300.000	300.000	300.000	300.000	300,000	300.000	300.000	200.000	300-000	300.000	
Weight		.433	.4/5 521	571	.626	.686	.735	.787	.843	.893	.946	.314	.353	.395	.433	.475	.521	•571	•626	•686	.735	.787	.843	.893	.946	.314	.353	.395	.433	.475	.521	.571	•626	989°	.735	187	2000	.924	
9	2	3304	3205	3307	3308	3309	3310	3311	3312	3313	3314	3401	3402	3403	3404	3405	3406	3407	3408	3409	3410	3411	3412	3413	3414	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2813	2814	

of data points = 260; rms deviation for CM function = 0.048%; rms deviation for dielectric constant = 0.018%. Number

Table 14. Comparisons with saturated liquid specific heats.

Data sources and ID numbers: (1)Dana, (2)Kemp, (8)Cutler, (30)Yesavage, (XXX)Goodwin.

ID	Weight	Temp.	Cσ, J/(Diff.
		K	expt	calc	%
106	1.000	85,598	83.95	84.10	17
239	1.000	85.723	83.83	84.10	 32
240	1.000	86.395	83.93	84.13	24
107	1.000	86.622	84.29	84.14	•17
201	1.000	86.763	84.32	84.15	.20
108	1.000	86.836	83.81	84.15	41
241	1.000	87.064	84.04	84.16	15
109 242	1.000	87.856	84.15 84.33	84.20	06
	1.000	87.870	84.17	84.20	•15
110 243	1.000	88.871		84.25	09
	1.000	88.931	84.28	84.25	•03
2	1.000	89.720	84.55	84.29	•31
111	1.000	89.879	84 • 48	84.30	•22
30	1.000	90.000	84.04	84.30	31
202	1.000	90.366	84.53	84.32	• 25
8	1.000	91.060	83.97	84.35	45
112	1.000	91.366	84.54	84.37	•20
113	1.000	93.321	84.73	84.46	• 32
8	1.000	93.430	84.22	84.47	29
203	1.000	95.166	84.78	84.55	•27
2	1.000	95.530	84.76	84.57	•22
114	1.000	95.750	84.73	84.58	•18
8	1.000	95.760	84 • 48	84.58	13
8	1.000	98.060	84.14	84.70	66
115	1.000	99.797	84.94	84.79	•18
30	1.000	100.000	84.86	84.80	•07
8	1.000	100.330	84.06	84.81	89
204	1 • 000	101.406	85.10	84.87	•27
2	1.000	101.960	85.09	84.90	•22
8	1.000	102.570	84.73	84.93	24
116	1.000	104.646	85.25	85.04	•24
8	1.000	104.780	85.06	85.05	•01
205	1.000	108.461	85.43	85.25	•21
2	1.000	108.500	85.43	85.26	•20
30	1.000	110.000	85.85	85.34	•60
117	1.000	110.300	85.53	85.36	•20
2	1.000	115.160	85.80	85.64	•19
206	1.000	115.393	85.79	85.66	•16
118	1.000	116.889	85.81	85.75	•08
30	1.000	120.000	86.72	85.94	•91
2	1.000	121.970	86.18	86.06	.14
207	1.000	122.132	86.18	86.07	•12
119	1.000	124.009	86.20	86.19	•01
208	1.000	128.738	86.51	86.51	00
2	1.000	128.900	86.56	86.52	•04
30	1.000	130.000	87.42	86.60	• 95
120	1.000	131.003	86.69	86.67	•03
209	1.000	135.238	86.92	86.97	06
2	1.000	135.950	87.23	87.02	•23
121	1.000	137.870	87.14	87.17	03

Table 14. (Continued).

Data sources and ID numbers: (1)Dana, (2)Kemp, (8)Cutler, (30)Yesavage, (XXX)Goodwin.

			· ·	0 -	
ID	Weight	Temp.	C _a , 1/(mot •K)	Diff.
		K	expt	calc	8
			,		
30	1.000	140.000	88.04	87.33	.82
210	1.000	141.629	87.35	87.45	12
2	1.000	142.790	87.44	87.54	13
122	1.000	145.757	87.68	87.78	12
211	1.000	147.902	87.87	87.96	10
2	1.000	149.740	88.15	88.11	•04
30	1.000	150.000	88.67	88.14	•61
	1.000	152.350		88.34	
123 212			88.16		20
	1.000	154.093	88.32	88.49	19
2	1.000	156.850	88.69	88.74	05
124	1.000	158.858	88.77	88.93	18
30	1.000	160.000	89.38	89.03	•39
213	1.000	160.343	88.97	89.07	11
2	1.000	164.390	89.36	89.46	11
1 25	1.000	165.298	89.30	89.55	28
214	1.000	166.378	89.58	89.66	08
30	1.000	170.000	90.24	90.03	.24
126	1.000	171.647	90.11	90.20	10
2	1.000	172.020	89.86	90.24	42
215	1.000	172.363	90.21	90.28	08
216	1.000	178.276	90.82	90.93	12
2	1.000	179.090	90.74	91.02	31
127	1.000	179.354	90.90	91 • 06	17
30	1.000	180.000	91.26	91.13	.14
			91 • 46	91.62	
217	1.000	184.114			17
128	1.000	185.534	91.67	91.79	13
2	1.000	185.900	91 .66	91 •83	19
218	1.000	189.882	92.19	92.34	16
30	1.000	190.000	92.46	92.35	•12
129	1.000	191.643	92.48	92.56	09
2	1.000	194.280	92.79	92.91	 13
219	1.000	195.603	93.01	93.09	09
130	1.000	197.686	93.21	93 • 38	18
30	1.000	200.000	93.83	93.70	•14
2	1.000	200.940	93.84	93.83	•00
220	1.000	202.405	93.74	94.05	33
131	1.000	204.154	94.13	94.30	18
2	1.000	207.090	94.26	94.74	51
221	1.000	209.358	95.04	95.09	06
30	1.000	210.000	95.35	95.20	.16
132	1.000	211.041	95.39	95.36	•03
2	1.000	213.100	95.43	95.69	27
222	1.000	216.234	96.25	96.21	•05
133					~. 05
	1.000	217.854	96.43	96.48	
2	1.000	219.250	96.27	96.72	47
30	1.000	220.000	97.04	96.85	•20
223	1.000	222.998	97.34	97.38	04
134	1.000	224.592	97.55	97.66	12
2	1.000	224.960	97.48	97.73	26
224	1.000	229.651	98.54	98.61	07
2	1.000	229.810	98.28	98.64	37

Table 14. (Continued).

Data sources and ID numbers: (1)Dana, (2)Kemp, (8)Cutler, (30)Yesavage, (XXX)Goodwin.

ID	Weight	Temp.	C ₀ , J/	(mol•K)	Diff.
		K	expt o,	calc	%
30	1.000	230.000	98.92	98.68	•25
135	1.000	231.245	98.90	98.92	02
225	1.000	236.231	99.81	99.91	10
136	1.000	238.095	100.16	100.30	14
30	1.000	240.000	100.99	100.70	• 29
1	0.000	241.760	99.82	101.08	-1.25
226	1.000	242.764	101.25	101.30	05
137	1.000	244.560	101.75	101.69	•05
1	0.000	246.880	96.49	102.22	- 5 . 60
30	1.000	250.000	103.31	102.95	•35
138	1.000	250.946	103.20	103.17	•03
1	0.000	252.820	100.55	103.62	-2.96
1	0.000	255.330	100.74	104.24	-3.3 6
139	1.000	257.248	104.75	104.73	•02
30	1.000	260.000	105.89	105.44	•43
	0.000	261.550	105.72	105.85	13
140	1.000	263.551	106.27	106.40	12
1	0.000	264.740	97.79	106.72	-8.37
1	0.000	266.440	106.27	107.20	87
	0.000	269.060	107.20	107.95	70
1 4 1	1.000	269.931	108.15	108-21	05
30	1.000	270.000	108.77	108.23	•50
142	1.000	276.292	109.98	110.15	16
1	0.000	276 • 430	107.01	110.20	-2.89
1	0.000	276.780	111.44	110.31	1.02
30	1.000	280.000	111.98	111.36	•56
143	1.000	282.595	111.96	112.24	֥25
1	0.000	287.550	107.75	114.00	-5.48
1 4 4	1.000	288 • 81 3	114.09	114.46	33
30	1.000	290.000	115.57	114.91	•57
1	0.000	291 • 590	110.89	115.52	-4.01
30	1.000	300.000	119.60	118.99	•52 •37
30	1.000	310.000	124.22	123.76 129.53	
30	1.000	320.000 330.000	129.70 136.63	136.83	•13 - •15
30 30	1.000	340.000	146.28	146.85	 39
30	1.000	350.000	162.17	162.81	 39
30 30	1.000	360.000	199.63	198.91	•36
30	1.000	J00 • 000	177.07	170.71	• 20

Number of data points = 139; rms deviation = 0.29%.

Table 15. Comparisons with C_V and C_p data.

C_p data of Ernst [26]

T = 293.15 K

Pressure MPa	Density kg/m3	C _p , J/(exp†	mol•K) calc	Diff.	Cp - Cp, expt	J/(mol•K) calc	Diff.
0.0000 .0490 .0981 .1961 .3432 .4903 .6374	0.00 .90 1.81 3.68 6.62 9.74 13.10	72.67 73.06 73.51 74.47 76.32 78.48 81.13 84.57	72.80 73.13 73.50 74.39 76.09 78.35 81.43 85.79	17 09 .01 .11 .30 .16 36	0.00 .39 .84 1.80 3.65 5.81 8.46 11.90	0.00 .33 .71 1.59 3.29 5.56 8.63 13.00	0.00 .06 .13 .21 .36 .25 17
			Τ =	313.15 K			
0.0000 .0490 .0981 .1961 .3432 .4903 .6374 .7845 .9807	0.00 .84 1.69 3.42 6.12 8.95 11.93 15.08 19.62 24.66	76.11 76.53 76.95 77.79 79.19 80.63 82.44 84.61 88.01 93.18	76.74 77.01 77.31 77.97 79.18 80.66 82.49 84.75 88.74 94.49	83 63 46 23 .02 04 06 17 82	0.00 .42 .84 1.68 3.08 4.52 6.33 8.50 11.90 17.07	0.00 .27 .56 1.23 2.43 3.92 5.74 8.01 12.00	0.00 .15 .28 .45 .65 .60 .59 .49 10
			T =	333.15 K			
0.0000 .0490 .0981 .1961 .3432 .4903 .6374 .7845 .9807 1.1768	0.00 .79 1.58 3.20 5.70 8.30 11.00 13.82 17.78 22.03 26.63	80.30 80.55 80.93 81.54 82.56 83.56 85.00 86.45 88.65 91.28 94.95	80.72 80.95 81.19 81.71 82.62 83.68 84.93 86.39 88.73 91.67 95.44	53 49 32 21 07 15 .08 .07 09 42	0.00 .25 .63 1.24 2.26 3.26 4.70 6.15 8.35 10.98	0.00 .22 .46 .98 1.89 2.96 4.21 5.67 8.01 10.94	0.00 .03 .17 .26 .37 .30 .49 .48 .34 .04
			Τ =	353.15 K			
0.0000 .0490 .0981 .1961 .3432 .4903 .6374 .7845 .9807 1.1768 1.3729	0.00 .74 1.49 3.01 5.34 7.75 10.23 12.79 16.36 20.10 24.06	84.40 84.59 84.79 85.36 86.19 86.97 88.01 89.02 90.65 92.39 94.37	84.71 84.90 85.10 85.52 86.23 87.05 87.96 89.00 90.59 92.45 94.66	37 37 36 19 05 09 .05 .02 .07 06	0.00 .19 .39 .96 1.79 2.57 3.61 4.62 6.25 7.99 9.97	0.00 .19 .39 .81 1.52 2.34 3.25 4.29 5.88 7.74 9.95	0.00 00 .00 .15 .27 .23 .36 .33 .37 .25

Number of data points of Ernst [26] = 40; mean deviation = 0.30%.

Table 15. (Continued). C_p data of Yesavage [104,105] P = 1.7237 MPa

Temp∙ K	Density kg/m³	C _p , J/(mol•K) calc	Diff.
116.483	702.41	85.79	85.67	•14
144.261	674.46	87.64	87.58	•07
172.039	646.27	89.85	90.11	-•29
199.817	617.30	93.17	93.48	-•33
227.594	586.89	97.79	97.98	-•20
255.372	554.04	104.06	104.09	-•03
283.150	517.13	112.73	112.76	-•03
310.928	472.66	128.41	126.80	-1•27
338.706	34.65	101.85	103.02	-1•14
366.483	29.70	98.89	99.10	-•21
394.261	26.41	102.03	100.66	1•36
		P = 3.4474 MPa		
116.483	703.14	85.98	85.63	.41
144.261	675.36	87.64	87.50	.16
172.039	647.40	89.67	89.98	35
199.817	618.74	92.80	93.27	50
227.594	588.77	97.60	97.62	02
255.372	556.63	103.51	103.45	.05
283.150	520.96	112.18	111.49	.62
310.928	479.14	124.17	123.55	.51
338.706	423.88	150.37	147.55	1.91
366.483	82.76	157.57	165.81	-4.97
394.261	63.07	122.14	120.50	1.36
422.039	53.88	114.02	114.63	53
		P = 6.8948 MPa		
116.483	704.58	85.98	85.54	.51
144.261	677.14	87.64	87.35	.32
172.039	649.60	89.48	89.74	29
199.817	621.53	92.62	92.87	27
227.594	592.39	97.05	96.97	.08
255.372	561.50	102.77	102.35	.41
283.150	527.90	110.15	109.44	.64
310.928	490.05	118.82	119.12	25
338.706	444.87	133.21	133.40	14
366.483	384.03	159.23	156.08	1.97
394.261	267.62	267.53	262.28	1.96
422.039	155.32	176.38	177.78	79

Table 15. (Continued).

C_p data of Yesavage [104,105]

P = 10.3421 MPa

Temp.	Density	Cp, J/(mol•K)	Diff.
K	kg/m ³	expt	calc	Z
116.483	705.99	86.16	85.46	•82
144.261	678.87	87.82	87.22	•69
172.039	651 • 75	89.85	89.52	•38
199.817	624 • 22	92.44	92.52	09
227.594	595.82	96.68	96.41	•28
255.372	566.02	102.03	101.42	•60
283 • 150	534.12	108.49	107.86	•58
310.928	499.13	116.42	116.18	•21
338.706	459.52	126.20	126.99	63
366.483	412.55	139.30	136.65	1.90
394 • 261	352.95	159.96	164.44	-2.80
422.039	276.85	177.68	180.32	-1.49
		P = 13.7895 MPa		
116.483	707.38	86.16	85.38	•91
144.261	680.57	88.01	87.09	1.05
172.039	653.84	90.22	89.31	1.01
199.817	626.81	92.44	92.19	•26
227.594	599.10	96.31	95.91	•42
255.372	570.25	101.29	100.63	•65
283.150	539.76	107.20	106.60	•56
310.928	506.97	113.84	114.05	18
338.706	471.06	122.51	123.17	54
366.483	430.88	131.55	128.97	1.96
394.261	385.05	146.13	147.46	92

Number of data points of Yesavage [104,105] = 58; mean deviation = 0.74%.

Table 15. (Continued).

C_V data of Goodwin [34]

ID	Weight	Temp. K	Density kg/m ³	C _V , J/(m		Diff.
		N	Kg/ IIP	expt	calc	Þ
145	1.000	296.740	497.86	74.25	73.32	1.25
146	1.000	301.507	497.55	74.20	74.23	04
147	1.000	307.514	497.15	75.28	75 • 41	18
148	1.000	313.479	496.76	76.27	76.62	46
149	1.000	319.395	496.40	77.31	77.87	72
150	1.000	325.273	496.01	78.14	79.13	-1.27
151	1.000	331.118	495.61	79.22	80.43	-1.52
152	1.000	336.944	495.26	80.26	81 • 72	-1.82
801	1.000	278.582	526.92	70.78	70.35	•60
802	1.000	284.558	526.43	71 . 75	71.39	•51
803	1.000	290.482	525.99	72.82	72.44	•52
804	1.000	296.874	525.51	73.98	73.62	•48
805	1.000	303.743	524.98	75.23	74.94	•39
806	1.000	310.524	524.49	76.47	76.30	•22
807	1.000	317.249	523.96	77.67	77.69	02
808	1.000	322.550	523.57	78.69	78.83	18
228	1.000	256.127	554.43	67.50	67.31	•28
229	1.000	258.883	554.21	68.04	67.72	•47
230	1.000	262.933	553.86	68.83	68.33	•72
231	1.000	268 • 252	553.38	69.77	69.16	•88
232	1.000	273.524	552.93	70.50	70.00	.71
233	1.000	278.769	552.45	71 • 33	70.86	•66
234	1.000	283.978	552.01	72.26	71.74	•72
235 901	1.000	289.142 238.172	551 • 52 575 • 87	73.34 66.22	72 • 65 65 • 37	•94 1•28
902	1.000	242.833	575.67	66.28	65.99	•43
902	1.000	248.402	574.85	67.18	66.75	•64
904	1.000	254.401	574.28	68.15	67.59	•83
905	1.000	260.329	573.70	69.08	68.44	•92
906	1.000	265.728	573.13	70.11	69.24	1.23
907	1.000	270.590	572.69	70.98	69.99	1.39
301	1.000	216.834	600.38	64.02	63.58	•69
302	1.000	220.658	599.99	64.05	64.02	•05
303	1.000	224.436	599.55	64.27	64.46	29
304	1.000	228.198	599.10	64.87	64.90	04
305	1.000	231.931	598.71	65.45	65.34	.16
306	1.000	235.624	598.27	66.07	65.79	•42
307	1.000	239.291	597.87	66.66	66.25	•61
401	1.000	188.878	630.46	61.48	61.92	72
402	1.000	192.681	629.93	61.84	62.28	71
403	1.000	196.572	629.40	62.23	62.65	68
404	1.000	200.428	628.91	62.78	63.02	39
405	1.000	204.255	628.39	63.27	63.39	20
406	1.000	207.852	627.90	63.83	63.75	•13
501	1.000	156.982	663.40	60.08	60.91	-1 •38
502	1.000	160.668	662.83	60.36	61.19	-1.38
503	1.000	164.253	662.25	60.80	61 • 46	-1.09
504	1.000	167.802	661.68	61 - 15	61.73	95
505 601	1.000	171.318	661 • 11	61 •60	62.00	64 -1.56
602	1.000	126 • 412 129 • 030	693.69 693.21	59.78 60.02	60.71 60.88	-1.44
603	1.000	131.699	692.68	60.22	61.05	-1.37
604	1.000	134.418	692.19	60.41	61 • 21	-1.33
605	1.000	137.115	691.66	60.60	61.37	-1.28
701	1.000	100.334	71′9.62	60.49	61 • 21	-1.20
702	1.000	102.729	719.09	60.76	61.35	97
703	1.000	105.095	718.56	60.85	61 • 48	-1.03
704	1.000	107.444	718.08	60.99	61.60	99

Number of C_V data points of Goodwin [34] = 58; mean deviation = 0.89%.

Table 16. Comparisons with velocity of sound data.

Velocities of sound from Younglove [107]

Temp.	Pressure	Density	Vel. of Sou	ind, m/s	Diff.
K	MPa	kg/m³	expt	calc	7,
		3.			,-
90.00	34.832	739.94	2205.4	2096.3	5.20
90.00	31 • 431	738 • 90	2196.2	2086.5	5.26
90.00	29.537	738.32	2190.8	2081.0	5.28
90.00	28.713	738.06	21 88.8	2078.6	5.30
90.00	25.132	736.95	2179.0	2068.2	5.36
90.00	23.317	736.37	21 73.7		5.37
	17.218			2062.9	
90.00		734.42	2156.5	2045.1	5.45
90.00	14.584	733.57	2149.0	2037.4	5.48
90.00	11.418	732.53	21 38 • 1	2028.1	5.42
90.00	8.863	731 • 68	2132.2	2020.6	5.52
90.00	6.049	730.74	2123.7	2012.3	5.54
90.00	2.803	729.64	2114.2	2002.8	5.56
100.00	34.567	730.51	2143.3	2034.0	5.37
100.00	29.991	729 • 01	2130.7	2019.9	5.48
100.00	26.613	727.88	2120.8	2009.5	5.54
100.00	23.338	726.77	2111.1	1999.3	5.59
100.00	20.305	725.73	2102.0	1989.9	5.63
100.00	17.123	724.63	2092.2	1979.9	5.67
100.00	14.272	723.63	2083.4	1970.9	5.71
100.00	11.703	722.71	2075.4	1962.9	5.74
100.00	8.572	721.59	2065.5	1952.9	5.76
100.00	5.731	720.56	2056.3	1943.9	5.78
100.00	2.911	719.52	2046.5	1935.0	5.77
				1975.8	5.39
110.00	34.556	721.26	2082.4		
110.00	31.729	720.26	2073.6	1966.6	5.44
110.00	28.901	719.26	2065.0	1957.4	5.50
110.00	26.116	718.26	2056.3	1948.2	5.55
110.00	25.122	717.90	2053.6	1945.0	5.58
110.00	23.877	717.44	2049.4	1940.8	5.59
110.00	20.485	716.20	2038.7	1929.6	5.65
110.00	17.505	715.09	2028.9	1919•6	5.69
110.00	14.464	713.94	2018.8	1909•4	5.73
110.00	11.682	71 2 • 87	2009.5	1900.0	5.76
110.00	8.647	711.70	1999.3	1889.7	5.80
110.00	5.821	710.59	1989.6	1880.1	5.83
110.00	3.031	709.48	1979.9	1870.5	5.85
120.00	34.725	712.15	2022.8	1920.8	5.31
120.00	31.000	710.75	2011.1	1908.0	5.40
120.00	28.663	709.86	2003.0	1899.9	5.43
120.00	24.899	708.41	1989.9	1886.8	5.46
120.00	20.438	706.65	1975.2	1871 • 1	5.56
120.00	17.354	705 • 42	1964.4	1860•1	5.61
120.00	14.194	704.13	1953.2	1848.8	5.65
120.00	11.756	703-13	1944.4	1840.0	5.68
120.00	8.661	701 • 84	1933.2	1828.7	5.71
120.00	5.368	700 • 44	1921.8	1816.6	5.79
	3.069	699.45	1912.4	1808.1	5.77
120.00			1905.1	1815.8	4.92
140.00	34.903	694.12			4.96
140.00	32 • 285	693.00	1895.5	1805.8	5.02
140.00	28.943	691.56	1882.9	1793.0	
140.00	26.339	690 • 41	1873 • 1	1782.9	5.06
140.00	22.925	688.89	1859.9	1769.4	5.11
140.00	20.345	687.72	1850.1	1759.2	5.17

Table 16. (Continued).

Velocities of sound from Younglove [107]

Temp.	Pressure MPa	Density kg/m ³	Vel. of Sou expt	nd, m/s calc	Diff.
140.00	17.664	686.49	1839.3	1748.4	5.20
140.00	14.149	684.84	1825.1	1734.1	5.24
140.00	11.218	683.45	1813.0	1722.1	5.28
140.00	8.444	682.10	1801.6	1710.5	5.32
140.00	5.864	680.83	1790.6	1699.7	5.35
140.00	3.332	679.57	1779.5	1688.9	5.36
160.00	34.565	676.08	1788.3	1713.9	4.34
160.00	31.986	674.83	1777.3	1703.0	4.39
160.00	28.855	673.29	1764.7	1689.6	4.44
160.00	26.279	672.00	1753.7	1678.5	4.48
160.00	23.072	670.36	1739.5	1664.4	4.52
160.00	20.151	668.85	1726.9	1651.4	4.57
160.00	17.530	667.46	1715.1	1639.5	4.61
160.00	14.481	665.82	1701.0	1625.5	4.64
160.00	8.699	662.61	1673.7	1598.4	4.71
160.00	2.970	659.29	1645.1	1570.6	4.75
180.00	34.078	658.06	1674.7	1614.5	3.73
180.00	31.939	656.88	1664.7	1604.5	3.75
180.00	29.069	655.27	1651.3	1590.9	3.80
180.00	26.357	653.73	1638.4	1577.9	3.84
180.00	23.460	652.04	1624.0	1563.7	3.85
180.00	20.351	650.19	1608.5	1548.2	3.89
180.00	17.298	648.33	1593.2	1532.7	3.95
180.00	14.624	646.67	1579•4	1518.9	3.99
180.00	11.422	644.62	1562.0	1502.0	4.00
180.00	8.599	642.77	1546.2	1486.7	4.00
180.00	5.902	640.96	1531.6	1471.9	4.05
180.00	2.978	638.95	1514.5	1455.4	4.06
200.00	34.672	640.69	1568.8	1522.8	3.02
200.00	34.484	640.58	1569.1	1521.9	3.10
200.00	31 • 631	638.80	1554.5	1507.2	3.14
200.00	29.363	637.35	1542.6	1495.3	3.16
200.00	25.937	635.12	1524.4	1477.0	3.20
200.00	24.001	633.83	1513.9	1466.5	3.23
200.00	20.329	631.32	1493.4	1446.1	3.27
200.00	17.287	629.17	1475 .7	1428.7	3.28
200.00	14.327	627.03	1458.2	1411.4	3.31
200.00	11.454	624.88	1440.7	1394.2	3.33
200.00	8.259	622.42	1420.4	1374.5	3.34
200.00	5.175	619.96	1400.2	1354.9	3.34
200.00	2.291	617.59	1380.8	1336.1	3.35
220.00	35.007	623.23	1468.0	1432.6	2.47
220.00	32.297	621.32	1452.6	1417.4	2.49
220.00	29.240	619.10	1434.9	1399.8	2.51
220.00	26.325	616.92	1417.6	1382.5	2.54
220.00	23.450	614.71	1400.0	1365.1	2.56
220.00	20.294	612.21	1380.2	1345.5	2.58
220.00	17.341	609.79	1361.1	1326.5	2.60
220.00	14.416	607.31	1341 • 3	1307.2	2.60
220.00	11.278	604.55	1319.3	1285.8	2.60
220.00	8.261	601.79	1297.4	1264.5	2.60
220.00	5.215	598.88	1274.4	1242.3	2.59
220.00	2.502	596.19	1252.9	1221.7	2.56
240.00	34.746	605.29	1366.8	1341.5	1.89

Table 16. (Continued).

Velocities of sound from Younglove [107]

Temp. K	Pressure MPa	Density kg/m3	Vel. of Sou	und, m/s calc	Diff.
240.00	32.790	603.72	1354.8	1329.4	1.91
240.00 240.00	29 • 186 26 • 744	600•73 598•63	1332.0 1316.0	1306.6 1290.6	1.94
240.00	23.703	595.94	1295.4	1270.2	1.96 1.98
240.00	20.621	593.10	1273.9	1248.9	2.00
240.00	18.127	590.72	1255.7	1231.0	2.01
240.00	14.415	587.03	1227.4	1203.4	1.99
240.00	11.607	584.09	1205.3	1181.6	2.01
240.00	8.064 5.102	580 • 20 576 • 75	1175.7 1149.6	1152.9	1.98
240.00 240.00	2.345	573.38	1123.7	1127.6 1103.0	1.95 1.88
260.00	35.001	587 • 63	1273.8	1256.0	1.42
260.00	32.123	584.98	1254.5	1236.5	1.45
260.00	29.341	582.32	1235.1	1217.1	1.48
260.00	26.676	579.68	1215.7	1197.9	1.48
260.00	26.220	579.22	1212.3	1194.6	1.48
260.00 260.00	23.713 20.287	576.63 572.93	1193.4 1166.5	1175.9 1149.3	1.49 1.50
260.00	17.384	569.63	1142.7	1125.7	1.51
260.00	14.786	566.53	1120.1	1103.8	1.48
260.00	11.579	562.50	1091.5	1075.4	1.50
260.00	5.843	554.60	1034.5	1020.3	1.40
260.00	2.867	550.07	1001.4	989.0	1.25
280.00 280.00	34.560 32.136	569 • 15 566 • 58	1181.5 1163.4	1168.6 1150.7	1.10 1.11
280.00	29.397	563.57	1142.6	1129.8	1.13
280.00	26.226	559.91	1117.3	1104.6	1.15
280.00	23.573	556.69	1095.3	1082.6	1.17
280.00	20.751	553 • 10	1070.5	1058.2	1.16
280.00	17.696	548.99	1042.4	1030.5	1.16
280.00 280.00	13.668 11.297	543•14 539•43	1002.4 977.5	991.5 967.0	1.10 1.08
280.00	8.576	534.88	946.8	937.2	1.03
280.00	5.555	529.40	910.0	901.6	•93
280.00	1.922	522.03	860.1	854.3	.67
300.00	34.752	551.10	1098.2	1089.2	•83
300.00 300.00	31.349 29.489	546.93 544.55	1071 • 2 1055 • 7	1061.7 1046.1	•89 •92
300.00	28.732	543.55	1049.0	1039.6	.90
300.00	25.120	538.61	1017.2	1007.7	.95
300.00	24.397	537.57	1010.4	1001.0	•94
300.00	22.137	534.23	989.1	979.7	•96
300.00	20.804	532.18	976.0 965.7	966.7	•97 •97
300.00 300.00	19.782 17.730	530 • 57 527 • 20	944.2	956.5 935.3	•95
300.00	17.569	526.93	942.3	933.6	.92
300.00	14.537	521.59	908.5	900.4	•90
300.00	14.149	520.87	904.0	896.0	•90
300.00	11.832	516.40	876.2	868.5	.88
300.00 300.00	11.200 9.608	515.12 511.78	868 • 4 847 • 4	860.7 840.4	.89 .82
300.00	8.167	508.57	827.6	821.1	.79
300.00	5.831	502.97	792.5	787.7	.62
300.00	5.504	502.14	787.5	782.7	•61
300.00	3.189	495.86	748.6	745.7	•38

Number of data points of Younglove [107] = 162; rms deviation = 3.91%.

Table 16. (Continued).

Saturated liquid velocities of sound from Younglove [107]

Temp. K	Pressure MPa	Density kg/m3	Vel. of Sc expt	ound, m/s calc	Diff.
90.000	.96855E-09	728.67	2106.2	1994.6	5.30
100.000	.25139E-07	718.44	2037.6	1925.7	5.49
110.000	.34511E-06	708.26	1969.2	1860.0	5.54
120.000	.29481E-05	698.12	1900.8	1796.7	5.48
130.000	•17534E-04	687.99	1832.6	1735.0	5.32
140.000	.78671E-04	677.87	1764.9	1674.6	5.12
150.000	•28235E-03	667.72	1697.4	1614.9	4.86
160.000	.84700E-03	657.51	1630.3	1555.8	4.57
170.000	•21959E-02	647.23	1563.3	1497.0	4.24
180.000	.50497E-02	636.85	1496.5	1438.3	3.89
190.000	•10512E-01	626.33	1430.0	1379.7	3.52
200.000	.20133E-01	615.66	1364.4	1320.9	3.19
210.000	•35944E-01	604.78	1298.5	1261.9	2.82
230.000	.96633E-01	582.27	1167.1	1142.8	2.09
250.000	.21783E+00	558.44	1036.5	1021.8	1.42
260.000	•31060E+00	545.88	971.6	960.4	1.16
270.000	.43042E+00	532.78	905.4	898.3	.79
290.000	.76931E+00	504.56	775.1	771.5	•47

Number of saturated liquid data points of Younglove [107] = 18; rms deviation = 4.02%.

Saturated liquid velocities of sound from Rao [72]

Temp. K	Density kg/m3	Vel. of Som	und, m/s calc	Diff.
140.000	677.87	1528	1674	-9.52
145.000	672.80	1499	1644	-9.71
150.000	667。72	1469	1614	-9.91
155.000	662.62	1439	1585	-10.13
160.000	657.51	1409	1555	-10.37
165.000	652.38	1379	1526	-10.62
170.000	647.23	1350	1496	-10.89
175.000	642.06	1320	1467	-11.17
180.000	636.85	1290	1438	-11.47
185.000	631.61	1260	1409	-11.78
190.000	626.33	1230	1379	-12.10
195.000	621.02	1200	1350	-12.44
200.000	615.66	1171	1320	-12.79
205.000	610.25	1141	1291	-13.16
210.000	604.78	1111	1261	-13.54
215.000	599.26	1081	1232	-13.93
220.000	593.67	1051	1202	-14.33
225.000	588.01	1021	1172	-14.75
230.000	582.27	992	1142	-15.18

Number of data points of Rao [72] = 19; mean deviation = 11.99%.

Table 16. (Continued).

Velocities of sound from Lacam [60]

T -	298.	15	W
_	Z70 e	10	

Pressure MPa	Density kg/m³	Vel. of Sou	und, m/s calc	Diff.
1.0133 2.0265 3.0398 4.0530 4.3570 5.0663 6.0795 7.0928 8.1060 9.1193 10.1325 12.6656 15.1988 17.7319 20.2650 25.3313 30.3975 35.4638 40.5300 50.6625 60.7950 70.9275 81.0600 91.1925 101.3250	492.25 495.35 498.28 501.05 501.85 503.68 506.19 508.59 510.90 513.12 515.25 520.28 524.93 529.26 533.32 540.77 547.49 553.63 559.30 569.51 578.54 586.68 594.10 600.93 607.28	72 4 742 758 774 778 7790 804 819 833 847 860 893 924 953 979 1017 1070 1110 1146 1214 1275 1331 1384 1432	71 9 737 755 771 776 787 802 816 830 844 857 888 916 944 969 1017 1061 1102 1140 1209 1272 1330 1384 1434	.59 .55 .38 .32 .22 .28 .28 .34 .33 .56 .77 .94 .94 05 .81 .72 .52 .35 .17 .02
		T = 323.15 K		
2.0265 3.0398 4.0530 4.3570 5.0663 6.0795 7.0928 8.1060 9.1193 10.1325 12.6656 15.1988 17.7319 20.2650 25.3313 30.3975 35.4638 40.5300 50.6625 60.7950 70.9275 81.0600 91.1925 101.3250	450.11 455.39 460.12 461.45 464.42 468.38 472.06 475.49 478.73 481.78 488.76 495.01 500.68 505.88 515.18 523.37 530.71 537.37 549.17 559.43 568.54 576.77 584.29 591.22	552 581 608 615 632 652 672 695 709 727 766 803 834 864 918 966 1011 1052 1126 1192 1252 1308 1360 1408	558 585 609 616 631 652 671 690 707 723 761 796 828 858 912 961 1006 1048 1123 1190 1251 1308 1360 1410	-1.23782825 .0108 .02 .70 .23 .43 .52 .78 .63 .63 .56 .43 .37 .24 .12 .02020615

Table 16. (Continued).

Velocities of sound from Lacam [60]

T = 398.15 K

Pressure MPa	Density kg/m³	Vel. of Sou expt	und, m/s calc	Diff.
1.0133 2.0265 3.0398 4.0530 4.3570 5.0663 6.0795 7.0928 8.1060 9.1193 10.1325 12.6656 15.1988 17.7319 20.2650 25.3313 30.3975 35.4638 40.5300 50.6625 60.7950 70.9275 81.0600 91.1925 101.3250	14.50 31.37 51.77 78.25 88.18 117.53 184.72 255.72 297.88 322.88 340.18 368.83 388.02 402.65 414.55 433.45 448.32 460.69 471.31 489.04 503.61 516.04 526.93 536.65 545.44	266 251 234 212 205 192 182 223 273 318 356 433 493 542 589 661 723 788 827 914 990 1056 1117 1174	271 255 237 216 209 192 183 214 262 306 344 420 480 531 575 650 714 770 820 909 986 1055 1118 1175	-1.99 -1.66 -1.36 -1.97 -2.085170 3.61 3.78 3.53 3.17 2.80 2.45 1.96 2.31 1.57 1.18 2.2274493405091427
		T = 423.15 K		
1.0133 2.0265 3.0398 4.0530 4.3570 5.0663 6.0795 7.0928 8.1060 9.1193 10.1325 12.6656 15.1988 17.7319 20.2650 25.3313 30.3975 35.4638 40.5300 50.6625 60.7950 70.9275 81.0600 91.1925 101.3250	13.46 28.59 45.87 66.15 73.02 90.88 122.17 161.20 203.00 239.42 268.58 316.39 345.24 365.56 381.26 404.99 422.89 437.37 449.59 469.59 485.72 499.33 511.14 521.61 531.02	277 265 252 238 233 223 213 211 218 243 275 352 415 468 515 597 660 716 757 854 931 1000 1064 1124 1180	282 269 255 241 237 226 213 209 220 242 268 341 405 459 506 587 654 713 765 857 937 1007 1071 1130	-1 · 81 -1 · 61 -1 · 55 -1 · 49 -1 · 74 -1 · 60 - · 31

Table 16. (Continued).

Velocities of sound from Lacam [60]

T = 448.15 K

Pressure	Density	Vel∙ of Sou	nd, m/s	Diff.
MPa	kg/m ³	exp†	calc	
1.0133	12.58	287	292	-1.74 -2.44 -3.59 -4.32 -4.28 -3.78 -1.83 .19 1.0454 -2.36 1.70 3.16 3.01 2.41 1.13 .79 .51174964706254
2.0265	26.37	275	281	
3.0398	41.59	262	271	
4.0530	58.59	250	260	
4.3570	64.10	247	257	
5.0663	77.84	241	250	
6.0795	99.93	236	240	
7.0928	125.23	234	233	
8.1060	153.27	235	232	
9.1193	182.12	238	239	
10.1325	209.26	247	252	
12.6656	263.68	304	298	
15.1988	301.13	364	352	
17.7319	327.55	417	404	
20.2650	347.46	463	451	
25.3313	376.53	540	533	
30.3975	397.69	608	603	
35.4638	414.41	667	663	
40.5300	428.28	720	717	
50.6625	450.60	810	811	
60.7950	468.32	888	892	
70.9275	483.10	958	964	
81.0600	495.82	1022	1029	
91.1925	507.03	1082	1088	
101.3250	517.06	1138	1144	
		T = 473.15 K		
1.0133 2.0265 3.0398 4.0530 4.3570 5.0663 6.0795 7.0928 8.1060 9.1193 10.1325 12.6656 15.1988 17.7319 20.2650 25.3313 30.3975 35.4638 40.5300 50.6625 60.7950 70.9275 81.0600 91.1925 101.3250	11.82 24.55 38.27 53.13 57.84 69.34 87.08 106.50 127.46 149.44 171.54 221.58 261.01 291.23 314.61 348.69 373.09 392.05 407.57 432.19 451.47 467.39 481.01 492.93 503.56	299 290 280 271 269 264 259 256 255 256 261 291 337 380 424 500 564 621 674 767 846 916 980 1040 1096	301 293 284 276 274 268 261 255 252 253 258 288 327 369 412 491 560 621 676 771 852 925 991 1051	81 -1.04 -1.74 -2.13 -1.99 -1.8191 .20 1.01 1.03 .80 .87 2.96 2.69 2.67 1.64 .5710315382 -1.04 -1.13 -1.09 -1.01

Table 16. (Continued).

Velocities of sound from Lacam [60]

T = 498.15 K

Pressure MPa	Density kg/m3	Vel. of S expt	ound, m/s calc	Diff.
1.0133	11.16	308	310	77
2.0265	23.00	301	303	82
3.0398	35.56	295	296	66
4.0530	48.90	288	290	92
4.3570	53.07	287	288	62
5.0663	63.10	282	284	89
6.0795	78.25	278	278	30
7.0928	94.37	274	274	05
8.1060	111.42	273	271	•71
9.1193	129.17	273	270	•98
10.1325	147.28	275	272	•92
12.6656	190.99	293	290	•86
15.1988	228.54	326	319	1.86
17.7319	259.38	360	353	1.86
20.2650	284.50	395	389	1.47
25.3313	322.27	465	461	•84
30.3975	349.50	529	527	•29
35.4638	370.53	586	587	22
40.5300	387.62	640	641	23
50.6625	414.44	734	736	34
60.7950	435.22	814	818	 58
70.9275	452.25	885	891	74
81.0600	466.73	948	957	-1.00
91.1925	479.34	1009	1017	89
101.3250	490.54	1065	1074	85

Number of data points of Lacam [60] = 174; mean deviation = 1.06%.

Table I7. Calculated P(T) isochores of propane. $Propane \ \, Isochore \ \, at \ \, 25 \ kg/m^3$

			Isotherm	Isochore	Isochore
Temp.	Pressure	Z	Derivative	Derivative	Curvature
K	MPa		MPa·m3/kg	MPa/K	MPa/K ²
705 514	1 1 4 2 7	70700			7.0 07.10
305.514	1.1433	• 79392	.03402	•00608	0000228
310.000	1.1704	•80096	。03544	•00599	0000183
318.000	1.2178	•81244	•03781	.00587	0000135
326.000	1.2644	•82279	.04016	•00577	0000106
334.000	1.3102	•83222	•04233	•00570	0000086
342.000	1.3555	•84086	•04455	.00563	0000072
350.000	1.4004	•84882	•04667	•00558	0000061
358.000	1.4449	•85620	•04876	.00554	0000052
366.000	1 • 4890	•86306	•05081	•00550	0000045
374.000	1.5328	•86946	•05283	•00546	0000040
382.000	1.5764	•87546	•05483	.00543	0000035
390.000	1.6197	•88108	•05680	•00541	0000032
398.000	1.6629	•88637	₃05876	•00538	0000028
406.000	1.7059	•89136	.06071	•00536	0000025
414.000	1.7487	•89607	•06263	•00534	0000023
422.000	1.7913	•90052	•06455	•00532	0000021
430.000	1.8338	•90475	•06645	•00531	0000019
438.000	1.8762	•90876	•06834	•00529	0000018
446.000	1.9185	•91257	•07023	•00528	0000016
454.000	1.9607	•91621	•07210	•00527	0000015
462.000	2.0028	•91967	•07396	•00526	0000014
470.000	2.0448	•92297	•07582	•00524	0000013
478.000	2.0867	•92613	•07767	•00523	0000012
486.000	2.1286	•92915	•07952	•00523	0000011
494.000	2.1703	• 93204	•08135	.00522	0000010
502.000	2.2120	•93481	.08319	•00521	0000010
510.000	2.2537	•93747	•08501	•00520	0000009
518.000	2.2953	•94002	•08684	•00519	0000009
526.000	2.3368	•94247	• 08865	•00519	0000003
534.000	2.3783	•94483	.09047	•00518	0000008
542.000	2.4197	•94710	•09228	•00518	0000007
550.000	2.4611	•94929	•09408	•00517	0000007
558.000	2.5024	•95139	•09588	•00516	0000007
566.000	2.5437	•95342	•09768	.00516	0000006
574.000	2.5850	• 95538	•09947	.00515	0000006
582.000	2.6262	•95727	•10127	•00515	0000006
590.000	2.6674	•95910	•10305	•00515	0000005
598.000	2.7085	•96087	•10484	•00514	0000005
606.000	2.7496	•96258	•10662	•00514	0000005
614.000	2.7907	•96423	•10840	•00513	0000005
622.000	2.8318	•96583	•11018	•00513	0000004
630.000	2.8728	•96738	•11196	•00513	0000004
638.000	2.9138	•96889	•11373	•00512	0000004
646.000	2.9548	•97034	•11550	•00512	0000004
654.000	2.9957	•97175	•11727	•00512	0000004
662.000	3.0366	•97312	•11904	.00511	0000004
670.000	3.0775	•97446	•12080	•00511	0000004
678.000	3.1184	•97575	•12257	•00511	0000003
686.000	3.1593	•97700	•12433	•00511	0000003
694.000	3.2001	•97822	•12609	•00510	0000003

Table 17. (Continued). Propane Isochore at 50 kg/m 3

\$334.400	Temp. K	Press ur e MPa	Z	lsotherm Derivative MPa∘m³/kg	lsochore Derivative MPa/K	Isochore Curvature MPa/K ²
334,000 2,1358 .67831 .02395 .01408 0000787 342,000 2,2463 .69670 .02707 .01357 0000317 350,000 2,3534 .71324 .02996 .01322 0000377 358,000 2,4581 .72832 .03269 .01296 0000243 366,000 2,5609 .74218 .03533 .01274 0000243 374,000 2,6621 .75501 .03789 .01256 0000203 382,000 2,6628 .77808 .04283 .01229 0000150 398,000 2,9866 .78851 .04524 .01217 0000150 398,000 2,9866 .79831 .04760 .01207 0000164 414,000 3,1518 .890754 .04994 .01199 0000116 412,000 3,2474 .81625 .05225 .01191 000003 458,000 3,4368 .83230 .03679 .01177 .000014 454,000	333.423	2.1277	•67690	•02371	•01412	0000819
342,000 2,2463 ,69670 •02707 •01357 -0000511 350,000 2,3534 .71324 •0296 •01322 -0000377 358,000 2,4581 .72832 •03269 •01296 -000297 366,000 2,5609 .74218 •03533 •01274 -0000237 374,000 2,6621 .75501 •03789 •01256 -0000203 382,000 2,7620 .76694 .04039 •01241 -0000174 398,000 2,9586 .78851 •04524 •01217 -0000150 406,000 3,0556 .79831 •04760 •01207 -0000116 414,000 3,1518 .80754 •04994 •01199 -0000104 422,000 3,2474 .81625 •05225 •01191 -000093 438,000 3,4568 .83230 •03679 •01177 -000096 446,000 3,5137 .85348 •05126 •01166 •0000063 452,000 3,7173 <td>334.000</td> <td>2.1358</td> <td>•67831</td> <td>•02395</td> <td>.01408</td> <td>0000787</td>	334.000	2.1358	•67831	•02395	.01408	0000787
550,000 2,5534 ,71324 ,02996 ,01322 -,0000377 558,000 2,5609 ,74218 ,03565 ,01296 -,0000297 366,000 2,5609 ,74218 ,03555 ,01274 -,000023 374,000 2,6621 ,75501 ,03789 ,01256 -,000013 390,000 2,8608 ,77808 ,04283 ,01229 -,0000150 398,000 2,9586 ,78851 ,04524 ,01217 -,0000150 398,000 3,0556 ,79831 ,04760 ,01207 -,0000164 406,000 3,0556 ,79831 ,04760 ,01207 -,0000116 414,000 3,1518 ,80754 ,04994 ,01199 -,0000116 422,000 3,2474 ,81625 ,05225 ,01191 -,0000093 438,000 3,4368 ,83230 ,05679 ,01177 -,000016 454,000 3,5242 ,84676 ,05126 ,01166 -,000006 462,000 <t< td=""><td></td><td></td><td>.69670</td><td>.02707</td><td>.01357</td><td>0000511</td></t<>			.69670	.02707	.01357	0000511
366.000		2.3534	.71324	.02996	• 01322	0000377
366.000 2,5609 .74218 .035535 .01274 0000243 374.000 2,6621 .75501 .03789 .01256 000023 382.000 2,7620 .76694 .04039 .01241 0000174 398.000 2,8608 .77808 .04283 .01229 0000152 406.000 3,0556 .79831 .04760 .01207 0000132 406.000 3,0556 .79831 .04760 .01207 0000114 414.000 3,1518 .80754 .04994 .01199 000104 422.000 3,2474 .81625 .05225 .01191 0000093 458.000 3,4368 .83230 .05679 .01177 0000084 458.000 3,5307 .83971 .05904 .01171 0000063 452.000 3,7173 .85548 .06347 .01161 0000064 452.000 3,8100 .85988 .06566 .01157 0000054 494.000	358.000	2.4581	.72832	•03269	•01296	0000297
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590.000 5.1704 .92955 .09740 .01117 0000021 598.000 5.2596 .93295 .09946 .01115 0000020 606.000 5.3487 .93623 .10152 .01113 0000019 614.000 5.4377 .93941 .10357 .01112 0000019 622.000 5.5266 .94249 .10562 .01110 0000018 630.000 5.6154 .94546 .10766 .01109 0000017 638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 00000013 686.000						
598.000 5.2596 .93295 .09946 .01115 0000020 606.000 5.3487 .93623 .10152 .01113 0000019 614.000 5.4377 .93941 .10357 .01112 0000019 622.000 5.5266 .94249 .10562 .01110 0000018 630.000 5.6154 .94546 .10766 .01109 0000017 638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000013 686.000 6.2339 .96393 .12185 .01101 00000013						
606.000 5.3487 .93623 .10152 .01113 0000019 614.000 5.4377 .93941 .10357 .01112 0000019 622.000 5.5266 .94249 .10562 .01110 0000018 630.000 5.6154 .94546 .10766 .01109 0000017 638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
614.000 5.4377 .93941 .10357 .01112 0000019 622.000 5.5266 .94249 .10562 .01110 0000018 630.000 5.6154 .94546 .10766 .01109 0000017 638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
622.000 5.5266 .94249 .10562 .01110 0000018 630.000 5.6154 .94546 .10766 .01109 0000017 638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
630.000 5.6154 .94546 .10766 .01109 0000017 638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
638.000 5.7041 .94835 .10970 .01108 0000016 646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
646.000 5.7926 .95114 .11173 .01106 0000016 654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
654.000 5.8811 .95386 .11377 .01105 0000015 662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
662.000 5.9694 .95649 .11579 .01104 0000015 670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
670.000 6.0577 .95904 .11782 .01103 0000014 678.000 6.1459 .96152 .11984 .01102 0000014 686.000 6.2339 .96393 .12185 .01101 0000013						
678.000 6.1459 .96152 .11984 .011020000014 686.000 6.2339 .96393 .12185 .011010000013		6.0577	•95904			0000014
686.000 6.2339 .96393 .12185 .01101 0000013		6.1459				
694.000 6.3219 .96626 .12387 .011000000013	686.000		•96393	•12185	•01101	0000013
	694.000	6.3219	•96626	•12387	•01100	0000013

Table 17. (Continued). Propane Isochore at 100 kg/m 3

-	5	-	Isotherm	Isochore	Isochore
Temp.	Pressure	Z	Derivative	Derivative	Curvature
K	MPa		MPa•m³/kg	MPa/K	MPa/K ²
358.586	3.4591	•51162	•00877	•03366	0003702
366.000	3.7013	.53634	•01224	.03190	0001643
374.000	3.9519	•56042	•01558	•03085	0001056
382.000	4.1957	•58253	•01875	.03013	0000780
390.000	4.4344	• 60304	•02182	•02957	0000617
398.000	4.6692	•62220	•02481	.02913	0000507
406.000	4.9007	•64018	.02776	•02876	0000428
414.000	5.1294	•65712	•03067	•02844	0000368
422.000	5.3558	•67311	•03355	•02816	0000321
430.000	5.5801	•68826	•03640	•02792	0000283
438.000	5.8026	•70263	•03922	•02771	0000253
446.000	6.0235	.71629	•04202	•02752	0000227
454.000	6.2429	• 72930	•04481	.02734	0000205
462.000	6.4611	•74171	•04758	•02719	0000187
470.000	6.6780	• 75357	•05033	•02704	0000171
478.000	6.8938	•76490	•05307	•02691	0000157
486.000	7.1086	• 77575	•05580	•02679	0000145
494.000	7.3225	•78615	•05851	•02668	0000135
502.000	7.5355	• 79613	•06122	•02658	0000125
510.000	7.7477	•80571	•06391	•02648	0000117
518.000	7.9592	•81492	•06660	• 02639	0000109
526.000	8.1700	•82378	•06928	•02630	0000103
534.000	8.3801	•83231	•07195	•02622	0000097
542.000	8.5896	•84052	•07461	•02615	0000091
550.000	8.7985	•84844	•07726	•02608	0000086
558.000	9.0069	•85608	•07991	•02601	0000082
566.000	9.2147	•86345	•08254	• 02595	0000078
574.000	9.4220	•87058	•08518	•02589	0000074
582.000	9.6289	•87746	•08780	•02583	0000071
590.000	9.8353	•88412	•09042	•02577	0000068
598.000	10.0413	·89056	•09304	•02572	0000065
606.000	10.2468	•89679	•09565	•02567	0000062
614.000	10.4520	•90283	•09825	•02562	0000060
622.000	10.6568	•90868	•10085	•02557	0000057
630.000	10.8612	•91 435	•10344	•02553	0000055
638.000	11.0652	•91 985	•10603	•02549	0000053
646.000	11.2690	•92518	•10861	•02544	0000051
654.000	11.4724	•93036	•11119	•02540	0000049
662.000	11.6754	• 93538	•11376	•02537	0000043
670.000	11.8782 12.0807	•94027	•11633 •11889	•02533 •02529	0000046 0000045
678.000	12.0807	•94501	•12145	•02526	0000045
686.000		•94962		•02522	0000044
694.000	12.4848	•95411	•12401	•02522	0000042

Table 17. (Continued). Propane Isochore at 150 kg/m 3

Temp.	Pressure MPa	Z	lsotherm Derivative MPa∙m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
367.611	4.0763	•39207	•00180	•05500	0014623
374.000	4.4144	•41733	•00465	•05172	0002530
382.000	4.8217	•44630	•00795	•05027	0001355
390.000	5.2201	•47326	•01124	.04937	0000942
398.000	5.6123	•49859	•01452	•04871	0000725
406.000	5.9999	•52252	•01781	•04819	0000588
414.000	6.3837	•54520	•02111	•04776	0000494
422.000	6.7643	•56675	.02441	.04740	0000425
430.000	7.1421	•58728	•02771	•04708	0000372
438.000	7.5176	•60686	.03103	•04630	0000331
446.000	7.8909	•62557	•03434	•04655	0000297
454.000	8.2624	•64348	•03766	•04632	0000269
462.000	8.6321	•66063	•04098	.04611	0000246
470.000	9.0003	•67708	•04430	•04593	0000226
478.000	9.3669	•69287	•04762	•04575	0000210
486.000	9.7323	•70805	•05094	•04559	0000195
494.000	10.0964	• 72264	•05426	•04544	0000182
502.000	10.4593	•73669	•05759	•04530	0000171
510.000	10.8212	• 75022	•06090	•04516	0000177
518.000	11.1820	•76326	•06422	•04504	0000153
526.000	11.5418	•77584	•06754	•04492	0000135
534.000	11.9007	•78798	•07086	.04481	0000138
542.000	12.2587	•79970	•07417	.04470	0000132
550.000	12.6159	•81103	•07748	.04459	0000132
558.000	12.9722	.82199	•08079	•04450	0000121
566.000	13.3278	•83258	•08409	.04440	0000117
574.000	13.6826	.84283	•08739	•04431	0000112
582.000	14.0368	•85276	•09069	•04422	0000112
590.000	14.3902	.86238	•09399	• 04414	0000105
598.000	14.7429	•87170	•09728	•04405	0000101
606.000	15.0950	.88073	•10057	•04397	0000098
614.000	15.4465	•88950	•10385	•04390	0000095
622.000	15.7974	•89800	•10713	•04382	0000093
630.000	16.1476	•90626	•11041	•04375	0000090
638.000	16.4973	•91427	•11368	•04368	0000088
646.000	16.8465	•92206	•11695	•04361	0000086
654.000	17.1950	•92963	•12022	.04354	0000084
662.000	17.5431	•93698	•12348	•04347	0000082
670.000	17.8906	•94413	.12674	•04341	0000080
678.000	18.2376	•95109	•12999	•04335	0000078
686.000	18.5841	•95786	•13324	•04328	0000076
694.000	18.9302	•96445	•13648	•04322	0000075
0			0,20,0		

Table 17. (Continued). Propane Isochore at 200 kg/ m^3

Temp∙ K	Pressure MPa	Z	lsotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
369.794	4.2430	•30427	• 00004	•07494	0161073
374.000	4.5495	•32258	•00170	•07229	0001647
382.000	5.1241	•35571	•00519	•07148	0000681
390.000	5.6941	•38717	•00887	•071 04	0000454
398.000	6.2611	• 41 71 7	•01266	•07072	0000350
406.000	6.8258	•44583	•01655	•07047	0000290
414.000	7.3886	•47327	•02050	•07025	0000252
422.000	7.9499	•49957	•02450	•07006	0000225
430.000	8.5097	•52479	•02855	•06989	0000206
438.000	9.0681	•54902	•03263	•06973	0000191
446.000	9.6254	•57231	•03675	•06958	0000180
454.000	10.1815	•59470	•04089	.06944	0000171
462.000	10.7365	•61626	•04505	.06931	0000164
470.000	11.2904	•63703	•04923	•06918	0000158
478.000	11.8434	•65704	•05343	•06906	0000153
486.000	12.3953	•67634	•05764	•06894	0000149
494.000	12.9464	•69497	•06186	•06882	0000145
502.000	13.4964	•71295	•06610	•06870	0000142
510.000	14.0456	• 73032	•07034	•06859	0000139
518.000	14.5939	•74711	•07458	•06848	0000137
526.000	15.1413	• 76335	•07884	•06837	0000135
534.000	15.6879	•77905	•08309	•06826	0000133
542.000	16.2335	• 79425	•08735	•06816	0000131
550.000	16.7784	•80897	•09161	•06805	0000129
558.000	17.3224	•82323	•09587	•06795	0000128
566.000	17.8656	•83704	•10014	•06785	0000126
574.000	18.4080	•85043	•10440	•06775	0000125
582 •000	18.9496	•86342	•10866	•06765	0000124
590.000	19.4904	•87602,	•11293	•06755	0000123
598.000 606.000	20.0305 20.5697	•88825 •90012	•11719 •12145	•06745	0000121 0000120
614.000	21.1082	•91165	•12570	•06736 •06726	0000120
622.000	21.6459	•92285	•12996	•06717	0000119
630.000	22.1829	•93373	•13421	•06707	0000117
638.000	22.7191	•94431	•13845	•06698	0000117
646.000	23.2545	•95460	•14270	•06689	0000115
654.000	23.7893	•96460	•14694	•06680	0000113
662.000	24.3233	•97434	•15117	•06671	0000114
670.000	24.8566	•98381	•15540	•06662	0000113
678.000	25.3892	•99303	•15963	.06653	0000112
686.000	25.9210	1.00201	•16385	•06644	0000110
694.000	26.4522	1.01076	•16807	.06635	0000109

Table 17. (Continued). Propane Isochore at 220.486 ${\rm kg/m}^3$

Temp∙ K	Pressure MPa	Z	lsotherm Derivative MPa∘m³/kg	Isochore Derivative MPa∕K	Isochore Curvature MPa/K ²
369.850	4.2475	•27625	0.00000	•08113	0000000
374.000	4.5841	•29484	•00173	•08112	0000007
382.000	5.2331	• 32953	•00554	.08111	0000020
390.000	5.8819	•36278	•00958	•08109	0000031
398.000	6.5306	.39469	•01378	•08106	0000041
406.000	7.1789	•42533	•01808	•08103	0000051
414.000	7.8270	•45477	•02247	•08098	0000059
422.000	8.4747	•48306	•02692	•08093	0000067
430.000	9.1219	•51028	.03143	•08088	0000074
438.000	9.7687	•53648	•03598	•08081	0000080
445.000	10.4149	•56171	•04057	•08075	0000086
454.000	11.0606	•58603	•04519	•08068	0000091
462.000	11.7057	•60947	•04984	•08060	0000096
470.000	12.3502	•63208	•05452	•08052	0000100
478.000	12.9941	•65390	•05921	.08044	0000104
486.000	13.6373	.67497	•06392	.08036	0000107
494.000	14.2798	•69533	•06864	•08027	0000110
502.000	14.9216	•71500	•07338	.08018	0000113
510.000	15.5627	•73402	•07813	.08009	0000115
518.000	16.2030	•75242	•08288	•08000	0000118
526.000	16.8426	•77022	•08764	•07990	0000119
534.000	17.4814	.78746	•09241	•07981	0000121
542.000	18.1195	*80416	•09718	•07971	0000122
550.000	18.7568	•82033	•10195	•07961	0000124
558.000	19.3932	•83601	•10673	•07951	0000125
566.000	20.0289	.85121	•11151	•07941	0000126
574.000	20.6638	•86595	•11629	•07931	0000126
582.000	21.2979	•88025	•12106	•07921	0000127
590.000	21.9311	.89413	.12584	• 07911	0000127
598.000	22.5635	•90761	•13061	•07900	0000128
606.000	23.1952	•92070	•13539	•07890	0000128
614.000	23.8260	•93342	•14016	•07880	0000128
622.000	24.4560	•94578	•14492	•07870	0000128
630.000	25.0851	•95779	·14969	•07859	0000128
638.000	25.7135	•96947	.15445	•07849	0000128
646.000	26.3410	•98083	•15920	•07839	0000128
654.000	26.9677	•99188	·16396	•07829	0000127
662.000	27.5936	1.00264	•16870	•07819	0000127
670.000	28.2187	1.01311	.17344	•07808	0000127
678.000	28.8430	1.02330	•17818	•07798	0000126
686.000	29.4664	1.03323	•18291	•07788	0000126
694.000	30.0891	1.04290	•18764	•07778	0000125

Table 17. (Continued). Propane Isochore at 250 kg/m 3

Temp.	Pressure MPa	Z	Isotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
369.676	4.2336	•24295	•00022	•09181	•0104534
374.000	4.6430	•26337	•00249	•09568	•0002745
382.000	5.4146	•30070	•00708	•09703	.0001114
390.000	6.1939	•33692	•01193	•09773	•0000696
398.000	6.9777	•37193	•01695	•09819	.0000490
406.000	7.7646	•40572	.02209	•09853	•0000362
414.000	8.5539	• 43833	•02733	•09878	•0000272
422.000	9.3450	•46979	•03264	•09897	.0000205
430.000	10.1374	•50014	•03802	•09911	•0000152
438.000	10.9307	•52943	.04344	•09922	•0000110
446.000	11.7248	•55771	•04891	•09929	•0000075
454.000	12.5193	•58501	•05441	•09934	•0000045
462.000	13.3142	•61137	•05995	•0993 7	•0000020
470.000	14.1091	•63685	•06551	•09937	0000002
478.000	14.9041	•66147	•07110	•09936	0000021
486.000	15.6989	•68528	•07670	•09934	0000037
494.000	16.4935	• 70831	•08232	•09930	0000051
502.000	17.2878	•73058	•08795	•09926	0000064
510.000	18.0816	• 75215	•09359	•09920	0000075
518.000	18.8750	•77302	•09924	•09914	0000085
526.000	19.6678	•79324	•10490	•09907	0000094
534.000	20.4600	•81 283	•11056	•09899	0000102
542.000	21.2516	•83182	•11622	•09890	0000109
550.000	22.0425	•85022	•12189	•09881	0000115
558.000	22.8326	•86807	•12756	•09872	0000120
566.000	23.6220	•88539	•13323	•09862	0000125
574.000	24.4106	• 90220	•13890	• 09852	0000130
582 • 000	25.1983	•91851	•14457	•09841	0000133
590.000	25.9852	•93435	•15024	•09831	0000137
598.000	26.7712	•94973	•15590	•09820	0000140
606.000	27.5563	• 96468	•16156	•09808	0000143
614.000	28.3405	•97921	•16721	•09797	0000145
622.000	29.1238	•99333	•17287	•09785	0000147
630.000	29.9061	1.00706	•17851	•09773	0000149
638.000	30.6875	1.02041	•18415	•09761	0000150
646.000	31 • 4680	1.03341	•18979	•09749	 0000151
654.000	32.2474	1.04605	•19542	•09737	0000152
662.000	33.0259	1.05836	-20104	•09725	0000153
670.000	33.8034	1.07034	•20665	•09713	0000154
678.000	34.5799	1.08200	•21226	•09700	0000155
686.000	35.3554	1.09337	-21786	•09688	0000155
694.000	36.1300	1.10444	•22346	•09675	0000155

Table 17. (Continued). Propane Isochore at 300 kg/m 3

Temp. K	Pressure MPa	Z	Isotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
366.998	4.0312	•19419	•00514	•12483	•0021808
374.000	4.9319	.23313	•01167	•13096	•0004589
382.000	5.9914	•27728	•01887	•13365	.0002542
390.000	7.0678	•32038	•02614	•13533	•0001743
398.000	8.1554	•36226	.03349	•13653	•0001296
406.000	9.2515	•40285	•04091	.13744	•0001004
414.000	10.3540	•44214	•04839	•13816	•0000794
422.000	11.4616	•48016	•05592	.13873	•0000635
430.000	12.5733	.51694	•06349	•13918	•0000509
438.000	13.6883	•55250	•07109	•13955	•0000407
446.000	14.8059	•58689	.07872	•13984	•0000323
454.000	15.9256	•62014	•08637	.14007	•0000253
462.000	17.0469	•65231	•09404	•14025	•0000192
470.000	18.1694	•68343	•10172	•14038	•0000141
478.000	19.2928	• 71 355	•10942	•14047	•0000096
486.000	20.4169	•74269	•11712	•14053	•0000057
494.000	21.5413	• 77090	•12483	•14057	•0000023
502.000	22.6659	•79822	•13254	•14057	0000008
510.000	23.7904	.82468	•14025	·14055	0000034
518.000	24.9147	•85031	•14796	•14052	0000058
526.000	26.0386	•87516	•15567	·14046	0000079
534.000	27.1620	•89924	•16338	•14039	0000097
542.000	28.2848	•92259	•17108	•14031	0000114
550.000	29.4069	•94524	.17 878	•14021	0000129
558.000	30.5282	• 96721	•18647	-14010	0000142
566.000	31.6485	•98853	•19415	•13998	0000154
574.000	32.7679	1.00923	•20183	•13985	0000165
582.000	33.8862	1.02933	•20949	•13972	0000174
590.000	35.0033	1.04884	•21715	•13958	0000183
598.000	36.1194	1.06781	•22479	•13943	0000190
606.000	37.2342	1.08623	•23243	•13927	0000197
614.000	38.3477	1.10414	•24005	•13911	0000203
622.000	39.4599	1.12155	•24767	•13895	0000209
630.000	40.5708	1.13848	• 25527	•1 <i>3</i> 878	0000214
638.000	41.6804	1.15495	•26286	•13861	0000218
646.000	42.7885	1.17098	•27043	•13843	0000222
654.000	43.8952	1.18657	•27800	•13825	0000225
662.000	45.0005	1.20175	• 28555	.13807	0000228
670.000	46.1043	1.21652	•29309	•13789	0000230
678.000	47.2067	1.23091	•30061	•13770	0000232
686.000	48.3075	1.24493	•30812	•13751	0000234
694.000	49.4069	1.25858	•31562	•13733	0000236

			Isotherm	Isochore	Isochore
Temp.	Pressure	Z	Derivative	Derivative	Curvatuge
K	MPa		MPa•m³/kg	MPa/K	MPa/K ²
359.023	3.4870	•14717	•02596	•17976	•0010206
366.000	4.7602	•19709	•03639	•18469	•0005142
374.000	6.2518	•25330	•04771	•18796	.0003294
382.000	7.7650	•30802	•05881	•19020	•0002378
390.000	9.2935	•36109	•06980	.19186	•0001812
398.000	10.8337	•41248	.08074	•19314	•0001420
406.000	12.3830	•46218	•09164	•19416	•0001129
414.000	13.9396	•51022	•10251	•19497	•0000903
422.000	15.5021	•55665	•11335	•19561	•0000723
430.000 438.000	17.0691 18.6399	•60152 •64488	•12418 •13498	•19613 •19654	•0000575
446.000	20.2135	•68677	•13490 •14576	•19686	•0000451 •0000346
454.000	21.7894	•72727	•15653	•19710	•0000346
462.000	23.3669	•76642	•16727	•19710	•0000237
470.000	24.9456	•80427	•17800	•19739	•0000133
478.000	26.5250	•84088	•18870	•19745	•0000113
486.000	28.1047	•87629	•19938	19748	•0000003
494.000	29.6845	•91056	•21004	•19746	0000042
502.000	31.2640	•94373	• 22068	•19741	0000082
510.000	32.8430	•97584	•23129	•19733	0000117
518.000	34.4213	1.00694	•24188	•19722	0000149
526.000	35.9985	1.03707	•25245	•19709	0000177
534.000	37.5747	1.06626	• 26299	•19694	0000202
542.000	39.1496	1.09455	•27351	•19677	0000224
550.000	40.7230	1.12198	·28401	•19658	0000244
558.000	42.2949	1.14858	•29448	•19638	0000262
566.000	43.8651	1.17438	•30492	•19617	0000278
574.000	45.4335	1.19942	•31534	•19594	0000292
582.000	47.0000	1 • 22372	• 32574	•19570	0000304
590.000	48.5647	1.24731	•33611	•19545	0000316
598.000	50.1272	1.27022	•34645	•19519	0000326
606.000	51 • 6877	1.29247	•35677	•19493	0000335
614.000	53.2461 54.8023	1.31409	•36706	•1 9466 10479	0000342
622.000 630.000	56.3562	1.33510 1.35553	•37733 •38758	•19438 •19410	0000349 0000356
638.000	57.9079	1.37538	•30770	•19381	0000356
646.000	59.4572	1.39469	•40799	•19352	0000366
654.000	61 • 0043	1.41348	•41816	•19323	0000370
662.000	62.5489	1.43175	•42830	•19293	0000373
670.000	64.0912	1.44954	•43842	•19263	0000376
678.000	65.6310	1.46685	44851	•19233	0000379
686.000	67.1684	1.48371	•45858	•19203	0000381
694.000	68.7034	1.50012	•46862	•19172	0000382

Table 17. (Continued). Propane Isochore at 400 kg/m 3

Temp. K	Pressure MPa	Z	lsotherm Derivative MPa∘m3/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
344.298 350.000	2.6430 4.1511	• 10178 • 15726	.07761 .08994	• 26305 • 26579	•0005614 •0004125
358.000	6.2892	.23293	•10663	• 26857	•0002939
366.000	8.4463	.30598	•12291	•27061	•0002207
374.000	10.6176	.37642	•13890	.27216	•0001698
382.000	12.7999	.44428	•15469	•27336	•0001320
390.000 398.000	14.9907 17.1881	•50965 •57261	•17032 •18581	• 27429 • 27502	•0001025 •0000788
406.000	19.3905	•63325	•20118	•27557	•0000788
414.000	21.5967	.69168	.21645	.27597	•0000431
422.000	23.8057	.74797	•23162	• 27626	•0000293
430.000	26.0167	.80223	.24670	•27645	•0000175
438.000	28.2287	•85454	.26171	•27655	•0000074
446.000 454.000	30.4412 32.6536	•90499 •95365	•27664 •29149	•27657 • 27653	0000014 0000091
462.000	34.8655	1.00062	•30628	•27643	0000158
470.000	37.0763	1.04596	•32100	• 27628	0000217
478.000	39.2858	1.08974	•33565	•27608	0000270
486.000	41.4935	1.13203	•35024	. • 27585	0000316
494.000	43.6992	1.17290	•36477	•27558	0000356
502.000 510.000	45.9027 48.1036	1.21241 1.25061	• 37924 • 39366	• 27528 •27495	0000392 0000424
518.000	50.3018	1.28756	•40802	•27460	0000424
526.000	52.4971	1.32332	•42232	.27423	0000478
534.000	54.6894	1.35793	•43657	• 27384	0000500
542.000	56.8785	1.39144	•45076	•27343	0000519
550.000	59.0642	1.42389	•46490	• 27301	0000537
558.000	61.2465	1.45533	•47899	-27257	0000552
566.000 574.000	63.4253 65.6005	1.48580 1.51534	•49303 •50703	• 27212 • 27167	0000565 0000577
582.000	67.7719	1.54398	•52097	•27120	0000587
590.000	69.9396	1.57176	•53486	•27073	0000596
		Propane Is	sochore at 450 kg/m	3	
322.304	1.6818	.06150	. 17785	•38324	•0002389
326.000	3.0999	.11207	•18875	•38406	•0002047
334.000 342.000	6.1782 9.2661	•21801 •31933	•21188 •23454	• 38545	•0001480
350.000	12.3608	•41624	•25682	•38646 •38717	.0001059 .0000732
358.000	15.4603	•50898	•27879	•38765	•0000467
366.000	18.5627	• 59776	•30047	• 38793	•0000249
374.000	21.6668	•68279	•32192	•38806	•0000065
382.000	24.7713	•76427	•34314	• 38805	0000090
390.000 398.000	2/.8/52	.84240	•36418	•38792	0000224
406.000	30.9777 34.0781	•91734 •98926	•38502 •40571	•38769 •38738	0000339 0000439
414.000	37 • 1756	1.05833	•42623	•38699	0000526
422.000	40.2698	1.12468	•44660	•38654	0000602
430.000	43.3601	1.18846	•46684	• 38603	0000669
438 - 000	46.4461	1.24979	•48694	.38547	0000727
446.000 454.000	49.5275	1.30880	•50691	• 38487	0000778
462.000	52.6040 55.6751	1.36560 1.42031	•52676 •54650	•38423 •38355	0000823 0000862
470.000	58.7408	1.47300	•56612	•38285	0000896
478.000	61.8007	1.52380	•58563	.38212	0000926
486.000	64.8546	1.57278	•60504	.38137	0000952
494.000	67.9025	1.62002	•62434	•38060	0000975
502.000	70.9442	1.66562	.64355	•37981	0000994

Table 17. (Continued). Propane Isochore at 500 kg/m 3

Temp.	Pressure	Z	Isotherm Derivative	Isochore Derivative	isochore Curvature
K	MPa		MPa·m3/kg	MPa/K	MPa/K ²
293.022	•8338	.03018	•34842	•55227	0001175
294.000	1.3738	•04957	•35223	•55216	0001176
298.000	3.5815	. 12748	•36772	•55168	0001187
302.000	5.7873	•20327	•38309	•55120	0001207
306.000	7.9911	•27701	• 39834	•55072	0001231
310.000	10.1930	•34878	•41348	•55022	0001260
314.000	12.3929	•41865	•42851	•54971	0001291
318.000	14.5907	•48669	•44343	•54919	0001324
322.000	16.7863	•55297	•45826	•54865	0001358
326.000	18.9798	•61756	•47300	•54810	0001391
330.000	21.1711	•68051	• 48764	•54754	0001424
334.000	23.3601	•74188	•50220	•54696	0001457
338.000	25.5468	•80172	•51668	•54637	0001489
342.000	27.7311	•86009	•53107	•54577	0001520
346.000	29.9129	.91704	• 54 5 3 9	•54515	0001550
350.000	32.0923	•97261	•55963	•54453	0001579
354.000	34.2691	1.02684	•57380	•54389	0001606
358.000	36.4434	1.07979	•58790	•54324	0001632
362.000	38.6151	1.13150	.60194	•54259	0001657
366.000	40.7841	1.18199	•61590	•54192	0001680
370.000	42.9504	1.23132	•62980	•54124	0001702
374.000	45.1140	1.27951	•64364	•54056	0001723
378.000	47.2749	1.32661	•65742	•53986	0001743
382.000	49.4329	1.37264	•67114	•53916	0001761
386.000 390.000	51.5881 53.7405	1.41765 1.46165	•68480 •69840	•53846 •53774	0001778 0001794
394.000	55.8901	1.50468	•71195	•53702	0001794
398.000	58.0367	1.54677	•72544	•53629	0001808
402.000	60.1804	1.58794	•73888	•53556	0001822
406.000	62.3212	1.62823	•75227	•53483	0001846
410.000	64.4590	1.66765	.76561	•53409	0001857
414.000	66.5939	1.70624	•77890	•53334	0001866
418.000	68.7258	1.74401	•79214	•53259	0001875
422.000	70.8546	1.78099	.80533	•53184	0001883
		Propane Is	sochore at 550 kg/m	3	
256.764	•2778	•01043	•61553	• 788 13	0006500
258.000	1.2512	•04676	•62175	• 7 8733	0006386
262.000	4.3955	•16178	•64182	•78485	0006056
266.000	7.5301	•27298	•66179	•78248	0005776
270.000	10.6555	•38056	•68166	•78022	0005537
274.000	13.7720	•48469	.70141	•77805	0005333
278.000	16.8800	• 58 5 52	• 72105	•77595	0005157
282.000	19.9797	•68321	•74059	•77392	0005005
286.000	23.0715	•77790	•76001	•77195	0004872
290.000	26.1554	•86971	•77933	•77002	0004756
294.000	29.2317	•95878	•79854	•76814	0004654
298.000	32.3005	1.04522	•81765	.76630	0004564
302.000	35.3621	1.12913	•83666	•76449	0004485
306.000	38 • 4 1 6 5	1.21062	•85556 97437	•76271 76005	0004414
310.000	41.4638	1.28979	•87437	•76095	0004350
314.000	44.5041	1.36673	•89308 01160	•75923	0004293 0004241
318.000 322.000	47.5376 50.5643	1.44153	•91169 93021	•75752 75583	0004241
326.000	50.5643 53.5843	1.51426	•93021 94863	•75583 •75416	0004193
330.000	53.5843 56.5976	1.58501 1.65385		•75416 •75251	0004130
334.000	59.6044	1.72085	•98522	•75088	0004110
338.000	62.6047	1.78609	1.00338	•74925	0004073
342.000	65.5985	1.84961	1.02146	•74764	0004005
346.000	68.5858	1.91148	1.03945	•74605	0003975
350.000	71.5669	1.97177	1.05736	.74447	0003946

Table 17. (Continued). Propane Isochore at 600 kg/m^3

Temp. K	Pressure MPa	Z	Isotherm Derivative MPa•m3/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
214.330 218.000 222.000 226.000 230.000 234.000 242.000 246.000 250.000 254.000 258.000 262.000 266.000 270.000 274.000 278.000	.0453 4.1460 8.5915 13.0141 17.4149 21.7951 26.1556 30.4972 34.8208 39.1270 43.4163 47.6893 51.9466 56.1884 60.4153 64.6276 68.8256	.00187 .16811 .34209 .50901 .66929 .82332 .97143 1.11396 1.25120 1.38344 1.51092 1.63390 1.75259 1.86719 1.97791 2.08493 2.18841	1.00752 1.03111 1.05677 1.08236 1.10786 1.13327 1.15857 1.18376 1.20883 1.23378 1.25861 1.28332 1.30790 1.33236 1.35669 1.38089 1.40497	1.12014 1.11437 1.10846 1.10287 1.09758 1.09255 1.08774 1.08312 1.07869 1.07441 1.07027 1.06626 1.06237 1.05858 1.05488 1.05128 1.04775	0016196001525200143560013576001289500122970011769001130100108840010512001017700098750009354000912700089190008727
		Propane Is	ochore at 650 kg/m	3	
167.316 168.000 170.000 172.000 174.000 176.000 180.000 180.000 184.000 184.000 186.000 190.000 192.000 194.000 196.000 200.000 202.000 204.000 206.000 210.000 211.000 214.000	.0017 1.0962 4.2857 7.4612 10.6231 13.7719 16.9082 20.0322 23.1446 26.2455 29.3354 32.4145 35.4833 38.5419 41.5906 44.6298 47.6595 50.6802 53.6918 56.6947 59.6891 62.6751 65.6528 68.6225 71.5843	.00008 .05324 .20570 .35395 .49815 .63847 .77507 .90807 1.03762 1.16385 1.28689 1.40684 1.52381 1.63792 1.74926 1.85793 1.96402 2.06761 2.16879 2.26764 2.36423 2.45863 2.55091 2.64115 2.72939	1.55418 1.55969 1.57585 1.59203 1.60825 1.62448 1.64073 1.65698 1.67324 1.68949 1.70573 1.72196 1.73817 1.75437 1.77054 1.77054 1.78668 1.80280 1.81889 1.83495 1.85098 1.8697 1.88293 1.88293 1.89885 1.91473 1.93057	1.60092 1.59840 1.59121 1.58429 1.57764 1.577123 1.56504 1.55328 1.54767 1.54223 1.53695 1.53182 1.52682 1.52195 1.51721 1.51258 1.50805 1.51721 1.51258 1.50805 1.49931 1.49507 1.49685 1.48685 1.48286 1.47894	0037221003669500352370033889003264000314820030406002940500284730026031002531900246520024025002402500228820022359002186600214000020959002014500197690019412

Table 17. (Continued). Propane Isochore at 700 kg/m^3

Temp. K	Pressure MPa	Z	lsotherm Derivative MPa∙m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
118.141 120.000 122.000 124.000 126.000 128.000 130.000 132.000 134.000 136.000 140.000 142.000 146.000 148.000 150.000	.0000 4.3335 8.9619 13.5567 18.1194 22.6518 27.1551 31.6308 36.0800 40.5039 44.9034 49.2794 53.6329 57.9647 62.2754 66.5658 70.8365	.00000 .27361 .55657 .82834 1.08956 1.34082 1.58265 1.81557 2.04004 2.25650 2.46534 2.66695 2.86167 3.04985 3.23177 3.40774 3.57802	2.30958 2.32730 2.34664 2.36621 2.38599 2.40593 2.42602 2.44622 2.46652 2.48690 2.50734 2.52782 2.54834 2.56887 2.58942 2.60996 2.63050	2.33998 2.32298 2.30565 2.28924 2.27365 2.25881 2.24465 2.23113 2.21818 2.20575 2.19382 2.18233 2.17125 2.16056 2.15022 2.14022 2.13052	0093942 0089059 0084286 0079956 0076018 0072429 0069151 0063398 0063867 0058536 0058384 0054394 0052550 0050838 0049246 0047762
		Propane Isoc	chore at 733.337 kg	_{1/m} ³	
85.470 86.000 87.000 88.000 99.000 91.000 92.000 93.000 94.000 95.000 97.000 98.000 99.000 100.000 101.000 102.000 104.000	.0000 1.6435 4.7295 7.7967 10.8456 13.8770 16.8915 19.8898 22.8723 25.8396 28.7922 31.7306 34.6552 37.5664 40.4646 43.3502 46.2236 49.0850 51.9349 54.7734	.00000 .13821 .39316 .64076 .88132 1.11513 1.34245 1.56356 1.77868 1.98806 2.19191 2.39044 2.58385 2.77233 2.95605 3.13518 3.30989 3.48033 3.64664 3.80897	3.01259 3.01733 3.02646 3.03585 3.04546 3.05529 3.06531 3.07551 3.08588 3.09640 3.10706 3.11785 3.12876 3.13977 3.15089 3.16210 3.17339 3.18476 3.19620 3.20770	3.10627 3.09573 3.07644 3.05790 3.04006 3.02287 3.00629 2.99483 2.95988 2.94542 2.93141 2.91783 2.90465 2.87943 2.86735 2.86735 2.85559 2.84414 2.83298	020102301967400189057018186001751130168780015197101470100142332013791801337470129804012607301225390119190011601201129950110128
104.000 105.000 106.000 107.000 108.000 109.000	57.6009 60.4177 63.2240 66.0201 68.8061 71.5824	3.96745 4.12221 4.27336 4.42103 4.56533 4.70636	3.21925 3.23086 3.24251 3.25421 3.26594 3.27770	2.82211 2.821150 2.80114 2.79103 2.78114 2.77148	0110120 0107402 0104807 0102336 0099980 0097733 0095588

Table 18. Calculated P(p) isotherms of propane.

Propane Isotherm at 90 K

Density kg/m3	Pressure MPa	Z	lsotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
•00	•0000	1.00000	•01697	•00000	0000000
728.67 728.75 729.37 730.62 731.25 731.88 732.50 733.12 733.75 734.37 735.00 735.62 736.25 736.25 736.88 737.50 738.12 738.75 740.00 740.62 741.25 741.88 742.50 743.12 743.75	.0000 .2195 2.0393 3.8720 5.7176 7.5762 9.4480 11.3329 13.2313 15.1430 17.0682 19.0071 20.9597 22.9261 24.9065 26.9009 28.9091 30.9318 32.9688 35.0202 37.0861 39.1667 41.2621 43.3723 45.4974 47.6377	.00000 .01775 .16477 .31257 .46116 .61055 .76074 .91173 1.06354 1.21617 1.36963 1.52392 1.67904 1.83501 1.99183 2.14950 2.30801 2.46740 2.62767 2.78881 2.95084 3.11376 3.27758 3.44229 3.60792 3.77447	2.89905 2.90152 2.92199 2.94261 2.96338 2.98431 3.00539 3.02662 3.04801 3.06956 3.09126 3.11312 3.13514 3.15733 3.17967 3.20218 3.22485 3.24769 3.27069 3.27069 3.27069 3.27069 3.29386 3.31721 3.34072 3.36440 3.38826 3.41229 3.43649	2.97836 2.97906 2.98482 2.99065 2.99654 3.00250 3.00853 3.01462 3.02077 3.02698 3.03326 3.03959 3.04599 3.04599 3.05244 3.05895 3.06552 3.07215 3.07883 3.08556 3.09235 3.09919 3.10608 3.11303 3.12002 3.12707 3.13416	0178732 0178557 0177725 0175726 0175726 0173021 0171716 0170440 0169195 0167979 0166792 0165634 0164505 0163404 0162331 0161285 0160266 0159274 0158308 0157368 015454 0155566 0154702 0153050 0152260
		Propane	e Isotherm at 100 K		
.00	.0000	1.00000	•01885	•00000	0000000
718.44 718.75 720.00 721.25 722.50 723.75 725.00 726.25 727.50 728.75 730.00 731.25 732.50 733.75 735.00 736.25 737.50 738.75 740.00 741.25	.0000 .8380 4.2110 7.6324 11.1031 14.6235 18.1944 21.8164 25.4904 29.2166 32.9961 36.8294 40.7173 44.6605 48.6598 52.7158 56.8295 61.0011 65.2319 69.5226	.00000 .06184 .31019 .56125 .81504 1.07161 1.33099 1.59321 1.85831 2.12631 2.39725 2.67118 2.94812 3.22812 3.51122 3.79744 4.08683 4.37940 4.67524 4.97435	2.66954 2.67912 2.71768 2.75675 2.79633 2.83644 2.87707 2.91824 2.95996 3.00222 3.04503 3.08841 3.13236 3.17689 3.22201 3.26772 3.31404 3.36096 3.40851 3.45670	2.72428 2.72726 2.73928 2.75151 2.76393 2.77656 2.78937 2.80238 2.81556 2.82893 2.84247 2.85618 2.87005 2.88409 2.89828 2.91263 2.91263 2.92713 2.94176 2.95654 2.97145	0140068013958401377060135912013420101325700131018012954201281410126814012555701243700123251012219801212110120287011942401186230117196

Table 18. (Continued).

Propane Isotherm at 110 K

Density kg/m ³	Pressure MPa	Z	Isotherm Derivative MPa•m3/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
•00	•0000	1.00000	•02074	•00000	0000000
708 • 26 708 • 75 710 • 00 711 • 25 712 • 50 713 • 75 715 • 00 716 • 25 717 • 50 718 • 75 720 • 90 721 • 25 722 • 50 723 • 75 725 • 90 726 • 25 727 • 50 728 • 75 730 • 90 731 • 25 732 • 50	.0000 1.2165 4.3362 7.5015 10.7130 13.9713 17.2768 20.6302 24.0321 27.4830 30.9835 34.5342 38.1358 41.7888 45.4938 49.2515 53.0628 56.9277 60.8473 64.8222 68.8530	.00000 .08276 .29446 .50852 .72495 .94378 1.16504 1.38874 1.61492 1.84361 2.07482 2.30859 2.54494 2.78390 3.02550 3.26976 3.51673 3.76641 4.01884 4.27406 4.53208	2.46350 2.47767 2.51395 2.55067 2.58783 2.62544 2.66351 2.70203 2.74102 2.78048 2.82041 2.86083 2.90173 2.94313 2.98503 3.02743 3.07034 3.11377 3.15773 3.20222 3.24726	2.50201 2.50672 2.51881 2.53106 2.54347 2.55604 2.56877 2.58165 2.59468 2.60786 2.62118 2.63464 2.64824 2.66198 2.67584 2.67584 2.68984 2.70396 2.71821 2.73257 2.74705 2.76165	011173601112170109942010872601075680105417010442201034790102587010174501002050099506009852009824300976770097154009667300962330095833
		Propane	Isotherm at 120 K		
•00	•0000	•99999	•02263	•00000	~.0000000
698.12 698.75 700.00 701.25 702.50 703.75 705.00 706.25 707.50 708.75 710.00 711.25 712.50 713.75 715.00 716.25 717.50 718.75 720.00 721.25 722.50 723.75 725.00	.0000 1.4457 4.3335 7.2640 10.2382 13.2564 16.3190 19.4266 22.5797 25.7787 29.0243 32.3169 35.6571 39.0453 42.4822 45.9682 49.5040 53.0900 56.7269 60.4152 64.1556 67.9485 71.7946	.00000 .09144 .27361 .45782 .64413 .83253 1.02305 1.21572 1.41054 1.60754 1.80675 2.00817 2.21184 2.41778 2.62600 2.83652 3.04938 3.26459 3.48217 3.70215 3.92455 4.14940 4.37670	2.27593 2.29310 2.32730 2.36189 2.39687 2.43225 2.46803 2.50420 2.54079 2.57778 2.61520 2.65303 2.69128 2.72997 2.76909 2.80865 2.84865 2.84865 2.84865 2.84865 2.84865 2.87138 3.01322 3.05552 3.09831	2.30506 2.31105 2.32298 2.33505 2.34726 2.35960 2.37207 2.38467 2.39739 2.41024 2.42321 2.43629 2.44950 2.46282 2.47626 2.48980 2.50346 2.51722 2.53109 2.54506 2.55913 2.57330 2.58757	009039700899370089937008905900882240087429008667500859590085282008464200840380083470008293700824380081540008113900801250080432008012500795980079378

Table 18. (Continued).

Propane Isotherm at 140 K

Frobatte Isotherm at 140 K						
Density kg/m3	Pressure MPa	Z	lsotherm Derivative MPa∘m3/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²	
.00	.0001	.99985	•02639	•00000	0000000	
677.87 678.75 680.00 681.25 682.50 683.75 685.00 686.25 687.50 688.75 690.00 691.25 692.50 693.75 695.00 696.25 697.50 698.75 700.00 701.25 702.50 703.75 705.00 706.25 707.50	.0001 1.7229 4.1973 6.7100 9.2615 11.8521 14.4823 17.1524 19.8628 22.6140 25.4064 28.2404 31.1164 34.0349 36.9963 40.0010 43.0494 46.1421 49.2794 52.4617 55.6897 58.9636 62.2841 65.6516 69.0664	.00000 .09616 .23383 .37313 .51408 .65667 .80093 .94687 1.09450 1.24384 1.39489 1.54769 1.70222 1.85853 2.01660 2.17647 2.33814 2.50163 2.66695 2.83411 3.00314 3.17404 3.34684 3.52155 3.69818	1.94295 1.96429 1.99480 2.02563 2.05678 2.08825 2.12004 2.15216 2.18460 2.21738 2.25049 2.28395 2.31774 2.35187 2.38635 2.42119 2.45637 2.49192 2.52782 2.56409 2.60072 2.663773 2.67511 2.71287 2.75101	1.96937 1.97729 1.98860 2.00001 2.01152 2.02312 2.03482 2.04662 2.05850 2.07049 2.08256 2.09472 2.110697 2.11932 2.13175 2.14426 2.15687 2.16956 2.18233 2.19518 2.20812 2.22114 2.23423 2.24741 2.26066	006104000607300060311005991500595410059189005855700578600577350057735005779000560170056293005611500560870056087	
		Propane	e Isotherm at 160 K	:		
.03	.0008	•99896	.03011	•00001	0000000	
657.51 658.75 660.00 661.25 662.50 663.75 665.00 666.25 667.50 668.75 670.00 671.25 672.50 673.75 675.00 676.25 677.50 678.75 680.00 681.25 682.50 683.75 685.00 686.25 687.50 688.75 689.00 681.25	.0008 2.0638 4.1795 6.3293 8.5138 10.7331 12.9877 15.2779 17.6041 19.9665 22.3656 24.8018 27.2753 29.7865 32.3359 34.9237 37.5502 40.2162 42.9217 45.6671 48.4529 51.2795 54.1472 57.0564 60.0075 63.0009 66.0371 69.1164	.00004 .10385 .20991 .31728 .42598 .53601 .64739 .76012 .87421 .98968 1.10653 1.22477 1.34441 1.46547 1.58795 1.71186 1.83721 1.96402 2.09229 2.22204 2.35327 2.48600 2.62023 2.75598 2.89526 3.03208 3.17244 3.31437	1.65218 1.67891 1.70616 1.73368 1.76147 1.78953 1.81787 1.84650 1.87540 1.99458 1.93405 1.99385 2.02419 2.05482 2.08574 2.11697 2.11697 2.14849 2.21245 2.224489 2.27764 2.31070 2.34407 2.37777 2.41178 2.44612 2.48079	1.69146 1.70179 1.71229 1.72287 1.73352 1.74425 1.75505 1.76592 1.77687 1.78789 1.79899 1.81016 1.82140 1.83271 1.84409 1.85554 1.86707 1.87866 1.89033 1.90206 1.91386 1.92573 1.93766 1.94967 1.96174 1.97387 1.98607 1.99834	004236600421670041980004180600416450041495004123300412330041017004092600407760040776004058200405730040574004058400406320040632004067000407730040773004077300407730040910	

Table 18. (Continued).

Propane Isotherm at 180 K

			Isotherm	Isochore	Isochore
Density	Pressure	Z	Derivative	Derivative	Curvature
kg/m3	MPa	_	MPa • m3/kg	MPa/K	MPa/K ²
3.					,,,,
• 15	•0050	•99585	•03366	•00003	0000000
676.05	0050	00007	4 7077	4 4	
636.85	•0050	•00023	1.39334	1.45552	0029811
637.50 638.75	•9157 2•6879	•04232 •12399	1 • 40575 1 • 4297೮	1.46049	0029772
640.00	4.4902	•20672	1.45405	1.47007 1.47972	0029703 0029641
641.25	6.3231	•29054	1.47856	1.48942	0029587
642.50	8.1867	•37544	1.50331	1.49919	0029540
643.75	10.0815	.46143	1.52830	1.50902	0029500
645.00	12.0076	•54853	1.55354	1.51891	0029468
646.25	13.9654	•63673	1.57903	1.52886	0029442
647.50	15.9553	• 72605	1.60476	1.53887	0029423
648.75	17.9774	.81649	1.63075	1.54894	0029411
650.00	20.0322	•90807	1.65698	1.55906	0029405
651.25	22.1200	1.00078	1.68347	1.56925	0029405
652.50	24.2410	1.09464	1.71022	1.57950	0029412
653.75	26.3957	1.18966	1.73722	1.58981	0029425
655.00 656.25	28.5842 30.8069	1.28584 1.38319	1.76447 1.79199	1.60018 1.61061	0029444 0029469
657.50	33.0643	1.48172	1.81977	1.62109	0029409
658.75	35.3565	1.58143	1.84781	1.63164	0029537
660.00	37.6839	1.68234	1.87612	1.64224	0029580
661.25	40.0469	1.78446	1.90470	1.65290	0029628
662.50	42.4458	1.88778	1.93354	1.66363	0029682
663.75	44.8809	1.99232	1.96265	1.67441	0029741
665.00	47.3525	2.09809	1.99204	1.68524	0029806
666.25	49.8611	2.20509	2.02170	1.69614	0029877
667.50	52.4069	2.31334	2.05163	1.70709	0029952
668.75	54.9903	2.42284	2.08185	1.71810	0030034
670.00 671.25	57.6116 60.2712	2.53360 2.64563	2.11234 2.14312	1.72917 1.74030	0030120 0030212
672.50	62.9695	2.75893	2.17418	1.75148	0030309
673.75	65.7068	2.87352	2.20553	1.76272	0030411
675.00	68.4835	2.98940	2.23716	1.77402	0030518
676.25	71.2999	3.10659	2.26909	1.78537	0030631
		Propane	Isotherm at 200 K		
• 54	•0201	•98835	•03685	•00010	0000000
(15 (6	0004	00007	1 16045	1 05110	000000
615.66 617.50	•0201 2•1878	•00087 •09396	1.16045 1.19146	1.25119 1.26400	0020992 0020990
620.00	5.2198	•22326	1.23427	1.28156	0021004
622.50	8.3599	•35613	1.27794	1.29932	0021034
625.00	11.6102	•49261	1.32249	1.31728	0021082
627.50	14.9731	•63277	1.36794	1.33545	0021146
630.00	18.4507	•77663	1.41429	1.35381	0021224
632.50	22.0453	•92427	1.46155	1.37238	0021318
635.00	25.7592	1.07573	1.50973	1.39115	0021426
637.50	29.5947	1.23106	1.55885	1.41013	0021548
640.00	33.5542	1.39031	1.60892	1.42931	0021684
642.50	37.6401	1.72000	1.65994	1.44869	0021833
645.00	41.8547	1.72080	1.71194	1.46827 1.48806	0021995 0022171
647.50 650.00	46 • 2006 50 • 6802	1.89214 2.06761	1.76492 1.81889	1.50805	0022171
652.50	55.2959	2.24728	1.87388	1.52825	0022560
655.00	60.0504	2.43119	1.92988	1.54865	0022774
657.50	64.9462	2.61941	1.98692	1.56925	0023001
660.00	69.9859	2.81197	2.04500	1.59005	0023239

Table 18. (Continued).

Propane Isotherm at 220 K

Density kg/m3	Pressure MPa	Z	lsotherm Derivative MPa∘m3/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
1.50	•0605	.97418	•03937	•00029	0000002
593.67 595.00 597.50 600.00 602.50 605.00 607.50 610.00 612.50 617.50 620.00 622.50 625.00 627.50 630.00 632.50 635.00 637.50 640.00 642.50 645.00	.0605 1.3397 3.8091 6.3717 9.0295 11.7846 14.6388 17.5944 20.6532 23.8175 27.0894 30.4710 33.9644 37.5719 41.2957 45.1380 49.1012 53.1875 57.3993 61.7389 66.2087 70.8111	.00245 .05428 .15369 .25601 .36129 .46958 .58091 .69534 .81289 .93363 1.05758 1.18480 1.31534 1.44922 1.58651 1.72725 1.87148 2.01924 2.17059 2.32558 2.48424 2.64663	.94999 .96935 1.00626 1.04395 1.08244 1.12172 1.16182 1.20274 1.24449 1.28709 1.33054 1.37485 1.42004 1.46611 1.51308 1.56095 1.60974 1.65946 1.71011 1.76172 1.81428 1.86782	1.07129 1.07964 1.09542 1.11137 1.12749 1.14379 1.16026 1.17691 1.19373 1.21072 1.22790 1.24525 1.26278 1.28049 1.29838 1.31645 1.33470 1.35314 1.37176 1.39056 1.40954 1.42871	0014563001460500146910014788001489400150090015133001526500154050015710001587400160460016225001641300166070016810001723700174620017935
		Propane	lsotherm at 240 K		
2.50 3.43	•1091 •1479	•96423 •95125	•04207 •04087	•00049 •00068	0000003 0000007
570.55 572.50 575.00 577.50 580.00 582.50 585.00 597.50 590.00 597.50 600.00 602.50 605.00 617.50 610.00 617.50 620.00 622.50 625.00 627.50 620.00 627.50 630.00	.1479 1.6519 3.6513 5.7303 7.8908 10.1346 12.4635 14.8793 17.3839 19.9792 22.6672 25.4497 28.3287 31.3063 34.3843 37.5649 40.8502 44.2422 47.7430 51.3547 55.0796 58.9199 62.8776 66.9552 71.1547	.00573 .06377 .14033 .21928 .30065 .38448 .47081 .55968 .65112 .74517 .84187 .94126 1.04337 1.14825 1.25594 1.36647 1.47988 1.59622 1.71553 1.83784 1.96319 2.09164 2.22321 2.35795 2.49590	.75993 .78402 .81555 .84779 .88074 .91441 .94882 .98397 1.01986 1.05653 1.09396 1.13217 1.17118 1.21098 1.25160 1.29304 1.33530 1.37841 1.42237 1.46719 1.51288 1.55945 1.60691 1.65527 1.70454	.91069 .92161 .93575 .95003 .96446 .97904 .99378 1.00866 1.02370 1.03889 1.05424 1.06974 1.08541 1.10123 1.11721 1.13336 1.11721 1.13336 1.14967 1.16614 1.18277 1.19957 1.21654 1.23368 1.25098 1.26845 1.28609	000971800098190009953001009200102350010382001053300106890011012001118000115280011708001189200122730012470001287700130870013521001374500137745

Table 18. (Continued).

Propane Isotherm at 260 K

Density kg/m³	Pressure MPa	Z	lsotherm Derivative MPa∙m³/kg	lsochore Derivative MPa/K	Isochore Curvature MPa/K ²
2.50 5.00 6.90	•1188 •2305 •3106	•96925 •94022 •91774	.04609 .04322 .04095	.00048 .00100 .00143	0000001 0000009 0000023
545.88 547.50 550.00 552.50 555.00 557.50 560.00 562.50 565.00 567.50 570.00 572.50 575.00 577.50 580.00 582.50 585.00 587.50 590.00 592.50 595.00	.3106 1.2778 2.8246 4.4373 6.1175 7.8668 9.6867 11.5789 13.5451 15.5869 17.7061 19.9043 22.1833 24.5449 26.9909 29.5230 32.1433 34.8534 37.6553 40.5510 43.5423 46.6313 49.8199	.01161 .04761 .10476 .16383 .22485 .28784 .35285 .41990 .48903 .56027 .63365 .70921 .78697 .86698 .94927 1.03387 1.12082 1.21015 1.30189 1.39609 1.49278 1.59199 1.69376	•58919 •60574 •63180 •65848 •68578 •71373 •74232 •77157 •80149 •83208 •86335 •89533 •92800 •96139 •99551 1.03036 1.06595 1.10229 1.13940 1.17727 1.21593 1.225538 1.29563	.76557 .77359 .78608 .79869 .81143 .82429 .83729 .85043 .86369 .87710 .89064 .90432 .91814 .93210 .94620 .96045 .97484 .98938 1.00406 1.01890 1.03388 1.04902 1.06430	00059470006052000621400063770006541000670600068720007039000720700073760007719000771900078930008068000824500084240008605000878700097160009736
602.50 602.50 605.00 607.50 610.00 612.50 615.00	53.1101 56.5040 60.0036 63.6110 67.3284 71.1577	1.79813 1.90513 2.01480 2.12718 2.24230 2.36020	1.33668 1.37856 1.42126 1.46481 1.50920 1.55445	1.07974 1.07974 1.09534 1.11109 1.12699 1.14305 1.15927	0009933 0010133 0010335 0010541 0010749 0010961

Table 18. (Continued).

Propane Isotherm at 280 K

Density kg/m ³	Pressure MPa	Z	lsotherm Derivative MPa∘m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
2.50	•1284	•97312	•05006	•00048	0000001
5.00	.2504	•94841	•04747	•00099	0000005
7.50	.3657	.92367	.04483	•00153	0000014
10.00	•4745	.89871	•04215	.00211	0000032
12.50	•5764	.87345	•03940	•00274	0000065
12.64	•5818	•87206	•03925	.00277	0000068
519.05	•5818	•02123	•43728	•63300	0002899
520.00	1.0001	.03643	•44501	•63709	0002971
522.50	2.1385	•07752	•46575	.64795	0003157
525.00	3.3293	.12012	•48703	•65891	0003340
527.50	4.5741	.16425	•50883	•66999	0003521
530.00	5.8740	•20993	•53119	•68118	0003699
532.50	7.2305	•25720	•55410	•69243	0003875
535.00	8.6449	•30607	•57758	•70390	0004050
537.50	10.1188	• 35659	.60163	•71543	0004223
540.00	11.6536	.40877	•62626	•72709	0004395
542.50	13.2506	•46265	•65149	.73886	0004567
545.00	14.9115	•51825	•67732	•75076	0004738
547.50	16.6378	• 57561	•70377	•76278	0004908
550.00	18.4309	•63475	• 73083	•77493	0005078
552.50	20.2925	•69570	• 75853	•78720	0005248
555.00	22.2241	•75849	• 78686	•79960	0005418
557.50	24.2273	•82315	•31585	.81213	0005588
560.00	26.3039	•88971	•84549	•82479	0005759
562.50	28.4553	• 95820	•87580	•83758	0005930
565.00	30.6834	1.02866	•90679	•85050	0006102
567.50	32.9899	1.10111	•93847	• 86356	0006275
570.00	35.3763	1.17559	•97084	•87675	0006443
572.50	37.8446	1.25212	1.00391	•89009	0006623
575.00	40.3965	1.33074	1.03770	•90355	0006798
577.50	43.0338	1.41149	1.07222	•91715	0006975
580.00	45.7582	1.49437	1.10747	•93090	0007153
582.50	48.5717	1.57944	1.14346	• 94478	0007333
585.00	51.4761	1.66674	1.18020	•95881	0007514
587.50	54.4733	1.75628	1 • 21 771	•97298	0007696
590.00	57.5653	1.84810	1.25598	•98730	0007881
592.50	60.7539	1.94224	1.29503	1.00175	0008067
595.00	64.0411	2.03873	1.33488	1.01636	0008255
597.50	67.4289	2.13759	1.37552	1.03111	0008445
600.00	70.9194	2.23888	1.41697	1.04601	0008637

Table 18. (Continued).

Propane Isotherm at 298.15 K

Density kg/m3	Pressure MPa	Z	lsotherm Derivative MPa∙m3/kg	Isochore Derivative MPa∕K	Isochore Curvature MPa/K ²
5.00 10.00 15.00 20.00 20.69	•2682 •5123 •7321 •9274 •9523	.95428 .91132 .86823 .82489 .81893	.05123 .04640 .04152 .03659 .03591	.00098 .00207 .00328 .00466 .00487	0000003 0000018 0000056 0000143 0000162
492.06 495.00 500.00 505.00 510.00 515.00 520.00 530.00 535.00 540.00 555.00 560.00 575.00 570.00 575.00 580.00 585.00	.9523 1.9078 3.6643 5.5938 7.7059 10.0102 12.5169 15.2363 18.1792 21.3570 24.7809 28.4630 32.4155 36.6509 41.1823 46.0231 51.1868 56.6876 62.5399 68.7586	.03443 .06856 .13036 .19704 .26878 .34576 .42819 .51625 .61015 .71011 .81633 .92902 1.04841 1.17471 1.30817 1.44900 1.59743 1.775372 1.91809 2.09080	•31561 •33459 •36830 •40385 •44131 •48075 •52225 •56587 •61169 •65978 •71020 •76304 •81837 •87625 •93676 •99998 1.06598 1.13483 1.20660 1.28138	•52153 •53258 •55167 •57114 •59103 •61134 •63208 •65326 •67490 •69701 •71959 •74266 •76623 •79030 •81488 •83999 •86562 •89179 •91851 •94579	0000534000078500011880001568000193000022790002618000295000032770003600000392100042410004561000488300052060005532000586200065350006879
		Propane	e Isotherm at 300 K		
5.00 10.00 15.00 20.00 21.70	•2700 •5161 •7382 •9361 •9979	•95482 •91245 •87002 •82741 •81284 •03607	.05161 .04682 .04200 .03714 .03546	.00098 .00206 .00327 .00464 .00515	0000003 0000017 0000053 0000131 0000177
490.00 495.00 500.00 505.00 510.00 515.00 525.00 530.00 535.00 540.00 555.00 550.00 550.00 570.00 570.00 575.00 580.00	1.2660 2.8929 4.6846 6.6502 8.7990 11.1408 13.6858 16.4443 19.4272 22.6458 26.1115 29.8362 33.8322 38.1121 42.6890 47.5761 52.7872 58.3364 64.2381 70.5072	.04567 .10332 .16564 .23281 .30501 .38244 .46529 .55374 .64802 .74832 .85485 .96783 1.08748 1.21402 1.34766 1.48865 1.63722 1.79360 1.95802 2.13074	.30950 .34157 .37542 .41112 .44873 .48833 .52999 .57378 .61977 .66803 .71864 .77166 .82717 .88524 .94594 1.00936 1.07555 1.14460 1.21658 1.29156	51379 53243 55144 57085 59067 61092 63159 65272 67430 69635 71887 74188 76539 78940 81392 83897 86454 89065 91731 94452	0000384000080400011960001567000192200022660002266000292800032510003571000388800042060004523000452300048420005163000581500064840006826

Table 18. (Continued).

Propane Isotherm at 320 K

Density kg/m ³	Pressure MPa	Z	lsotherm Derivative MPa∘m³/kg	lsochore Derivative MPa∕K	Isochore Curvature MPa/K ²
5.00	•2896	•96001	•05569	•00098	0000002
10.00	•5571	•92329	•05130	•00203	0000011
15.00	.8027	•88695	•04696	•00319	0000031
20.00	1.0268	•85089	•04267	•00445	0000067
25.00	1.2295	•81513	•03844	•00584	0000126
30.00	1.4112	•77966	•03425	•00737	0000224
35.00	1.5721	• 74445	•03009	•00907	0000395
35.90	1.5988	•73814	•02934	•00939	0000439
454.43	1.5988	•05831	•18978	•39604	•0002105
455.00	1.7071	•06218	•19226	•39777	•0002042
460.00	2.7243	•09816	.21485	•41316	•0001530
465.00	3.8580	•13751	•23883	•42886	•0001077
470.00	5.1151	•18038	•26427	•44489	•0000666
475.00	6.5032	•22691	•29122	•461 28	•0000288
480.00	8.0299	•27726	•31974	•47803	0000067
485.00	9.7033	•33159	•34990	•49516	0000404
490.00	11.5317	•39005	•38177	•51267	0000726
495.00	13.5239	•45282	•41540	•53059	0001038
500.00	15.6888	•52005	•45086	•54892	0001341
505.00	18.035 7	•59192	•48822	•56767	0001637
510.00	20.5742	•66862	•52753	•58684	0001929
515.00	23.3144	•75031	•56888	•60646	0002217
520.00	26.2665	.83719	•61233	•62651	0002503
525.00	29.4413	•92944	•65794	•64703	0002787
530.00	32.8496	1.02726	• 70579	•66800	0003071
535.00	36.5030	1.13084	•75594	•68945	0003355
540.00	40.4130	1.24037	•80847	• 71137	0003641
545.00	44.5918	1.35608	•86346	• 73377	0003927
550.00	49.0518	1.47815	•92096	• 75667	0004216
555.00	53.8057	1.60680	•98106	•78007	0004508
560.00	58.8668	1.74224	1.04382	•80398	0004804
565.00	64.2485	1.88469	1.10932	•82840	0005102
570.00	69.9647	2.03437	1.17763	•85335	0005406

Table 18. (Continued).

Propane Isotherm at 340 K

Danathy	Pressure	Z	Isotherm	Isochore	Isochore
Density kg/m³	MPa	2	Derivative MPa•m³/kg	Derivative MPa/K	Curvature MPa/K ²
Kg/ III-	7 II G		THE CHAPTER	I'll G/IX	I'll G/R
5.00	•3091	•96433	•05972	•00097	0000002
10.00	•5976	•93214	•05567	•00202	0000008
15.00	•8660	•90055	•05170	•00314	0000021
20.00	1.1147	•86943	•04781	•00435	0000042
25.00	1.3443	•83876	•04402	•00565	0000075
30.00	1.5550	•80856	•04031	•00704	0000121
35.00	1 • 7475	•77882	•03668	•00854	0000184
40.00	1.9220	•74953	•03315	•01014	0000270
45.00	2.0791	•72069	•02969	•01185	0000390
50.00	2.2190	•69230	•02632	•01368	0000559
55.00	2.3424	•66434	•02302	•01566	0000814
59.00	2.4293	•64224	•02042	•01736	0001134
411.22	2.4293	•09215	•09518	•28646	•0004850
415.00	2.8079	10554	•10536	• 29545	•0004259
420.00	3.3701	•12517	•11969	•30755	•0003612
425.00	4.0065	.14705	•13504	•31991	.0003072
430.00	4.7223	•17131	•15147	•33254	•0002606
435.00	5.5230	•19805	•16901	•34548	•0002193
440.00	6.4144	•22741	•18774	•35873	•0001819
445.00	7.4024	•25948	•20769	•37232	•0001475
450.00	8.4934	• 29442	•22892	•38624	•0001154
455.00	9.6939	•33234	•25148	-40051	•0000851
460.00	11.0106	•37338	•27544	•41515	•0000562
465.00	12.4506	•41767	•30083	•43015	•0000284
470.00	14.0214	• 46536	•32773	•44552	•0000014
475.00	15.7305	•51659	•35618	•46128	0000248
480.00	17.5859	•57150	•38625	•47743	0000506
485.00	19.5958	•63026	•41799	. 49397	0000759
490.00	21.7687	•69300	.45147	•51093	0001010
495.00	24.1134	•75989	•48675	•52829	0001258
500.00	26.6392	•83109	• 52 3 88	•54607	0001505
505.00	29.3555	•90676	•56295	•56428	0001751
510.00	32.2721	•98708	•60401	•58292	0001997
515.00	35.3990	1.07221	•64713	•60200	0002244
520.00	38.7469	1.16233	•69238	•62153	0002492
525.00	42.3265	1.25762	•73982	•64151	0002741
530.00	46.1489	1.35826	•78953	•661 95	0002992
535.00	50.2256	1.46443	•84157	•68286	0003245
540.00	54.5686	1.57632	•89602	•70424	0003500
545.00	59.1900	1.69413	•95295	•72610	0003759
550.00	64.1024	1.81806	1.01243	• 74845	0004021
555.00	69.3186	1.94829	1.07453	•771 29	0004287

Table 18. (Continued).

Propane Isotherm at 350 K

Density kg/m ³	Pressure MPa	Z	Isotherm Derivative MPa∘m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
5.00	·3188	•96623	•06173	•00097	0000001
10.00	•6177	•93599	•05783	•00201	0000007
15.00	.8973	•90643	•05402	•00312	0000018
20.00	1.1580	•87738	•05030	•00431	0000035
25.00	1.4004	.84882	.04667	•00558	0000061
30.00	1.6249	•82075	.04314	•00694	0000096
35.00	1.8320	•79316	•03971	•00838	0000142
40.00	2.0221	.76605	•03636	•00990	0000202
45.00	2.1958	•73941	•03311	•01152	0000279
50.00	2.3534	.71324	•02996	•01322	0000377
55.00	2.4955	•68755	•02689	•01502	0000503
60.00	2.6225	•66233	•02393	•01692	0000669
65.00	2.7350	.63761	•02107	•01892	0000892
70.00	2.8334	•61337	•01831	.02104	0001210
75.00	2.9183	•58963	•01565	•02330	0001701
76.97	2.9482	•58039	•01462	•02425	0001981
383.34	2.9482	•11654	•05595	•23168	•0006864
385.00	3.0435	•11979	•05895	•23498	•0006467
390.00	3.3618	•13062	•06849	•24504	•0005488
395.00	3.7296	.14308	•07880	•25530	•0004735
400.00	4.1511	•15726	•08994	• 26579	•0004125
405.00	4.6305	•17325	. 10195	•27654	•0003614
410.00	5.1721	•19116	•11487	•28757	•0003171
415.00	5.7808	.21108	•12876	•29889	•0002780
420.00	6.4614	•23312	•14366	•31051	•0002426
425.00	7.2191	•25740	•15961	•32245	•0002101
430.00	8.0593	• 28401	•17666	•33471	•0001799
435.00	8.9876	•31308	•19485	34731	•0001514
440.00	10.0098	•34473	•21425	• 36025	•0001243
445.00	11.1321	•37907	•23489	•37353	•0000983
450.00	12.3608	• 41 624	•25682	•38717	•0000732
455.00	13.7026	•45635	•28011	•40118	•0000487
460.00	15.1643	•49954	•30480	•41555	•0000248
465.00 470.00	16.7530	•54594 •59569	•33095	•43029 •44542	•0000014 -•0000218
	18.4763 20.3417	•64893	•35861 •38784	•46093	0000218
475.00 480.00	22.3573	•70581	•41869	•47684	0000447
485.00	24.5315	• 76646	•45124	•49314	0000874
490.00	26.8727	• 831 04	• 48554	•50986	0001126
495.00	29.3899	•89970	•52165	•52698	0001120
500.00	32.0923	•97261	•55963	•54453	0001579
505.00	34.9894	1.04991	•59956	•56250	0001379
510.00	38.0912	1.13178	•64149	•58090	0002034
515.00	41.4078	1.21838	•68549	•59975	0002264
520.00	44.9497	1.30988	•73164	•61903	0002496
525.00	48.7279	1.40645	•77999	•63877	0002730
530.00	52.7534	1.50828	•83063	•65897	0002967
535.00	57.0380	1.61554	.88361	.67963	0003207
540.00	61 • 5936	1.72842	•93901	•70076	0003449
545.00	66.4323	1.84710	•99690	•72237	0003696
550.00	71 • 5669	1.97177	1.05736	.74447	0003946

Table 18. (Continued).

Propane Isotherm at 360 K

Density kg/m ³	Pressure MPa	. Z	lsotherm Derivative MPa∘m³/kg	lsochore Derivative MPa/K	Isochore Curvature MPa/K ²
10.00	•6377	•93953	•05997	•00200	0000006
20.00	1.2009	•88463	•05274	•00428	0000030
30.00	1.6938	•83179	•04590	•00685	0000078
40.00	2.1202	•78090	•03945	•00972	0000159
50.00	2.4840	•73189	•03336	•01290	0000281
60.00	2.7888	•68476	•02767	•01637	0000458
70.00	3.0388	•63956	•02241	•02012	0000714
80.00	3.2385	•59639	•01761	•02416	0001097
90.00	3.3928	•55537	•01331	•02849	0001722
100.00	3.5064	•51657	•00949	.03319	0002952
105.05	3.5498	•49781	•00773	•03579	0004225
345.52	3.5498	•15136	•02308	•17379	•001 0800
350.00	3.6630	•15418	• 02749	•18069	•0008926
360.00	3.9928	•16340	•03884	•19646	•0006480
370.00	4.4477	•17709	•05254	•21305	•0005062
380.00	5.0525	•19588	•06888	•23062	•0004087
390.00	5.8352	•22043	•08818	•24930	•0003341
400.00	6.8269	•25144	•11073	•26914	•0002727
410.00	8.0618	•28968	•13687	•29021	•0002192
420.00	9.5773	•33594	•16692	•31255	•0001708
430.00	11.4144	•39107	•20125	•33623	•0001257
440.00	13.6178	•45596	•24022	•36127	•0000826
450.00	16.2357	•53153	•28423	•38774	.0000409
460.00	19.3205	•61878	•33369	•41566	0000002
470.00	22.9290	•71872	•38902	•44510	0000409
480.00	27.1221	•83244	•45069	•47609	0000817
490.00	31.9654	•96107	•51916	•50868	0001228
500.00	37.5296	1.10580	•59493	•54292	0001645
510.00	43.8900	1.26785	•67851	•57885	0002069
520.00	51.1276	1.44852	•77043	•61653	0002502
530.00	59.3283	1.64914	•87125	•65601	0002947
540.00	68.5840	1.87112	•98151	•69734	0003405

Table 18. (Continued).

Propane Isotherm at 365 K

Density kg/m ³	Pressure MPa	Z	Isotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
10.00	•6477	.94120	.06103	•00200	0000005
20.00	1.2223	.88802	•05394	。00426	0000027
30.00	1.7280	•83694	•04726	•00681	0000071
40.00	2.1687	•78780	•04095	•00965	0000143
50.00	2.5481	· 74051	•03501	•01277	0000248
60.00	2.8701	•69506	•02945	•01615	0000394
70.00	3.1386	•65150	•02432	•01979	0000592
80.00	3.3581	•60993	•01965	•02367	0000861
90.00	3.5333	•57045	•01548	•02776	0001232
100.00	3.6693	•53317	•01180	•03207	0001769
110.00	3.7711	•49814	.00864	•03658	0002620
120.00	3.8436	•46541	•00595	•04134	0004220
129.01	3.8877	•43786	•00388	•04602	0007955
316.85	3.8877	.17829	•00970	•14060	•0016214
320.00	3.9208	·1 7804	•01135	•14449	•0013495
330.00	4.0638	•17894	•01751	•15699	•0009013
340.00	4.2763	•18276	•02528	.17013	•0006853
350.00	4.5758	•18997	•03494	•18416	•0005525
360.00	4.9823	.20110	•04674	•19918	•0004589
370.00	5.5187	•21673	•06095	•21525	•0003865
380.00	6.2103	•23747	•07785	•23245	•0003268
390.00	7.0856	•26399	•09773	•25081	•0002750
400.00	8.1758	•29700	•12089	•27038	•0002283
410.00	9.5154	•33723	•14766	.29121	•0001851
420.00	11.1421	■ 38548	•17837	•31334	•0001441
430.00	13.0971	•44258	.21337	•33680	•0001045
440.00	15.4251	•50940	•25304	•36164	•0000657
450.00	18.1748	•58687	•29777	.38791	•0000274
460.00	21.3988	•67595	• 34797	•41564	0000108
470.00	25.1539	•77766	•40407	•44487	0000492
480.00	29.5015	•89307	•46653	• 47566	0000880
490.00	34.5073	1.02328	•53581	•50805	0001 273
500.00	40.2421	1.16948	•61242	•54209	0001674
510.00	46.7817	1.33287	•69686	•57781	0002084
520.00	54.2071	1.51473	.78967	•61528	0002505
530.00	62.6047	1.71638	•89139	•65454	0002938

Table 18. (Continued).

Propane Isotherm at 369.85 K

			Isotherm	Isochore	Isochore
Density	Pressure	Z	Derivative	Derivative	Curvature
kg/m ³	MPa		MPa•m³/kg	MPa/K	MPa/K ²
10.00	•6574	• 94275	•06206	~.0000005	
20.00	1.2429	•89118	•05511	•00200 •00425	0000025
30.00	1.7609	•84172	•04856	•00425	0000066
40.00	2.2153	•79418	•04030	•00958	0000130
50.00	2.6098	•74848	•03657	•01265	0000130
60.00	2.9480	•70457	•0307/	•01598	0000346
70.00	3.2339	•66249	•02612	•01953	0000507
80.00	3.4719	•62234	•02155	•02329	0000712
90.00	3.6666	•58421	•01747	•02724	0000712
100.00	3.8229	•54821	•01747	•03134	0001294
110.00	3.9458	•51439	•01078	•03556	0001294
120.00	4.0402	•48281	•00817	•03989	0001703
130.00	4.1107	• 45345	•00601	•04428	0002228
140.00	4.1617	•42628	•00425	•04428	- .0002913
150.00	4.1971	•40124	.00423	•05317	0005132
160.00	4.2203	•37824	•00287	•05761	0007047
170.00	4.2344	•35719	•00102	•06200	0010085
180.00	4.2422	•33796	•00054	•06631	0015403
190.00	4.2458	•32045	•00022	•07048	0026162
200.00	4.2472	•30452	•00022	•07445	~. 0053878
210.00	4.2474	•29004	•00001	•07809	0174253
220.00	4.2475	•27686	.00000	•08104	-4.0792227
230.00	4.2475	•26482	•00001	•08395	•0196702
240.00	4.2479	•25381	•00009	•08798	•0064395
250.00	4.2497	•24376	•00031	•09279	•0034335
260.00	4.2550	•23468	•00079	•09834	•0022257
270.00	4.2668	•22661	•00165	•10466	.0016038
280.00	4.2896	•21969	•00301	•11176	•0012345
290.00	4.3292	•21407	•00504	•11968	•0009934
300.00	4.3931	•20999	•00790	•12846	•0008247
310.00	4.4907	•20773	.01180	•13812	•0007000
320.00	4.6332	•20762	•01692	•14872	•0006035
330.00	4.8339	•21006	•02349	•16028	•0005259
340.00	5.1085	•21546	•03173	•17284	.0004612
350.00	5.4748	•22431	•04188	•18645	•0004057
360.00	5.9533	•23714	•05420	•20113	•0003565
370.00	6.5669	•25451	•06895	•21694	•0003119
380.00	7.3413	•27704	•08641	•23389	•0002706
390.00	8.3051	•30537	•10687	• 25203	•0002316
400.00	9.4897	•34021	•13063	.27141	•0001942
410.00	10.9298	•38228	. 15802	•29204	•0001578
420.00	12.6634	•43236	•18937	•31398	•0001220
430.00	14.7317	•49129	•22504	•33726	•0000866
440.00	17.1798	•55990	•26539	•361 93	.0000512
450.00	20.0564	•63913	•31082	•38801	•0000157
460.00	23 • 41 45	•72992	•36174	•41556	0000202
470.00	27.3110	•83328	•41858	•44462	0000566
480.00	31 •8074	•95025	•48180 EE107	•47522	0000936
490.00	36.9698	1.08193	•55187	•50742	0001314
500.00	42.8692	1.22949	•62928	•54127	0001701
510.00	49.5816	1.39412	•71455	•57680	0002099
520.00	57.1883	1.57708	•80822	•61407	0002508
530.00	65.7758	1.77967	•91082	•65312	0002929

Table 18. (Continued).

Propane Isotherm at 375 K

			Isotherm	Isochore	Isochore
Density	Pressure	Z	Derivative	Derivative	Curvature
kg/m ³	MPa		MPa•m³/kg	MPa/K	MPa/K ²
10.00	•6677	• 94434	•06315	•00199	0000005
20.00	1.2648	•89439	•05633	•00199	0000003
30.00	1.7957	•84658	•04992	•00424	00000025
40.00	2.2645	•80067	•04389	•00952	
50.00	2.6746	• 75655	•03820	•01254	0000118
	3.0298	•71418		•01294	0000199
60.00			•03289		0000306
70.00	3.3339 3.5910	•67359 •63484	•02799 •02351	•01929 •02295	0000439 0000601
80.00 90.00	3.8057	•59805	•01951	•02679	0000792
100.00	3.9827	•56328	•01598	•03075	0001012
110.00	4.1270	•53062	•01294	•03481	0001012
120.00	4.2431	•50008	•01036	•03895	0001238
130.00	4.3356	•47168	•00821	•04312	
140.00	4.4086	•44537	•00621	.04731	0001797 0002057
150.00	4.4660	•42108	•00507	•05148	0002077
160.00	4.5110	•39874	•00399	•05563	0002272
170.00	4.5466	•37825	.00399	•05975	0002397
	4.5755	•35951	•00263	•06385	0002397
180.00				•06796	
190.00 200.00	4.5998 4.6217	•34240 •32683	•00228 •00212	•07214	0001881 0001377
	4.6428	•32663	•00212	•07643	0001377
210.00		•29985			
220.00	4.6642		•00218	•08090	0000045
230.00	4.6866	•28819	•00232	•08560	•0000722 •0001521
240.00	4.7109	•27761	•00257	•09059	
250.00	4.7388	•26809	•00304	•09593	•0002302
260.00	4.7729	•25963	•00383 •00503	•10174	.0003000 .0003554
270.00	4.8167	•25231		.10809	
280.00	4.8753	•24626	•00679	•11510	•0003931
290.00	4.9549 5.0631	•24164 •23869	•00924 •01256	•12284 •13140	•0004126 •0004163
300.00	5.0051				
310.00		•23768 •23893	•01693 •02255	•14083 •15119	•0004080
320.00	5.4059 5.6655	•24281	.02963	•16253	•0003911 •0003686
330.00	6.0041	•24201	•03840	•17488	•0003427
340.00	6.4400			•17400	•0003427
350.00	6.9935	•26023 •27475	•04910 •06199	• 20278	•0003148
360.00 370.00	7.6880	•27475	•07733	•20276	•0002559
380.00	8.5492	•31819	•09540	•23516	•0002258
390.00	9.6060	•34835	•11648	•25313	•0001953
400.00	10.8899	•38504	.14089	•27233	•0001999
410.00	12.4358	•42898	•16894	•29279	•0001334
420.00	14.2819	•48093	•20097	•31456	•0001019
430.00	16.4697	•54170	•23734	•33767	•000700
440.00	19.0443	•61215	•27841	•36215	•0000700
450.00	22.0549	•69316	•32458	•38806	•0000045
460.00	25.5543	•78569	•37627	•41543	0000293
470.00	29.6000	•89071	•43389	•44431	0000638
480.00	34.2535	1.00927	•49792	•47473	0000992
490.00	39.5813	1.14245	•56882	•50674	0001355
500.00	45.6545	1.29139	.64709	•54038	0001728
510.00	52.5494	1.45727	•73324	•57572	0002113
520.00	60.3474	1.64134	•82781	•61278	0002510
530.00	69.1355	1.84488	. 93134	•65161	0002920

Table 18. (Continued).

Propane Isotherm at 380 K

Density	Pressure	-7	Isotherm	Isochore	Isochore
ka/m ³	MPa	Z	Derivative	Derivative	Curvature
Kg/ III-	MFd		MPa•m³/kg	MPa/K	MPa/K ²
10.00	•6777	04507	0.5.4.0.4		
20.00	1.2859	•94583	•06421	•00199	0000004
30.00		•89739	•05752	•00423	0000022
	1.8294	.85109	•05124	•00672	0000056
40.00	2.3119	•80669	•04533	•00946	0000108
50.00	2.7371	•76404	•03977	•01245	0000180
60.00	3.1085	• 7 2308	•03457	•01566	0000273
70.00	3.4298	•68384	•02976	•01908	0000387
80.00	3.7050	•64639	•02537	•02268	0000520
90.00	3.9387	•61080	•02144	•02642	0000671
100.00	4.1353	•57716	•01797	•03029	0000835
110.00	4.2996	•54554	•01496	•03425	0001006
120.00	4.4361	•51595	•01241	•03828	0001008
130.00	4.5492	•48840	•01028	•04235	0001179
140.00	4.6429	•46286	•00853	•04645	
150.00	4.7209	•43927	•00713	•05056	0001452
160.00	4.7866	•41754	•00605	•05468	0001527
170.00	4.8428	•39760	•00525		0001536
180.00	4.8924	•37935	•00323	•05882	0001469
190.00	4.9377	•36271	•00440	•06300	0001318
200.00	4.9810	•34760	•00429	•06726	0001088
210.00	5.0242	•33392	•00429	•07163	0000788
220.00	5.0686	•32156		•07615	0000434
230.00	5.1154	•31041	•00455	.08088	0000037
240.00	5.1654	•30039	•00481	•08586	•0000393
250.00	5.2208	•29147	•00523	•09114	•0000846
260.00	5.2846		•00590	• 09679	•0001303
270.00	5.3609	•28368 •27712	•00693	•10286	•0001742
280.00	5.4550		•00842	•10945	•0002136
290.00	5.5735	•27191	•01 051	•11664	•0002462
300.00	5.7246	•26824	•01333	•12450	•0002706
310.00	5.9183	•26633	•01706	•13311	•0002860
320.00		•26646	•02187	•1 4255	•0002929
330.00	6.1663 6.4824	•26895	•02795	15288	.0002920
340.00		•27416	• 03553	•16415	•0002848
350.00	6.8825	•28253	•04481	•17641	•0002725
360.00	7.3851	•29449	•05604	•18970	•0002563
370.00	8.0107	•31057	•06948	•20408	•0002369
380.00	8.7829	•33131	.08539	• 21 956	•0002152
390.00	9.7277	•35729	•10404	•23620	.0001917
	10.8739	•38915	•12573	•25403	•0001667
400.00	12.2535	•42755	. 15076	•27309	•0001405
410.00	13.9014	•47322	•17945	•29341	•0001132
420.00	15.8559	•52691	•21215	•31502	•0000849
430.00	18.1588	•58940	•24919	•33798	•0000557
440.00	20.8555	•661 55	•29097	•36231	•0000256
450.00	23.9952	•74422	•33786	•38806	0000054
460.00	27.6311	•83836	•39028	•41527	0000373
470.00	31.8207	• 94494	•44867	•44397	0000702
480.00	36.6259	1.06497	•51348	•47422	0001041
490.00	42.1133	1.19954	•58519	•50605	0001391
500.00	48.3542	1.34976	•66428	•53951	0001752
510.00	55.4253	1.51680	• 751 29	•57466	0002125
520.00	63 • 4081	1.70190	•84673	•61152	0002123

Table 18. (Continued).

Propane Isotherm at 390 K

Density	Pressure	Z	Isotherm Derivative	Isochore Derivative	Isochore Curvature
kg/m ³	MPa		MPa·m3/kg	MPa/K	MPa/K ²
20.00	1.3281	•90305	•05987	•00421	0000019
40.00	2.4060	.81800	.04817	•00936	0000091
60.00	3.2638	.73975	•03784	.01542	0000224
80.00	3.9294	•66795	•02898	•02222	0000407
100.00	4.4344	•60304	•02182	•02957	0000617
120.00	4.8137	•54552	•01640	.03731	0000809
140.00	5.1012	• 49551	•01260	•04530	0000928
160.00	5.3270	•45277	•01020	•05351	0000920
180.00	5.5171	•41682	•00900	•06202	0000759
200.00	5.6941	.38717	•00887	•07104	0000454
220.00	5.8773	•36330	•00956	•08084	0000042
240.00	6.0802	•34452	.01087	•09175	.0000441
260.00	6.3202	•33057	•01342	• 10413	•0000950
280.00	6.6314	•32208	•01814	•11848	•0001409
300.00	7.0678	•32038	•02614	•13533	•0001743
320.00	7.7077	•32755	•03874	•15523	•0001902
340.00	8.6586	•34632	•05753	• 17867	•0001882
360.00	10.0621	•38010	•08432	.20609	•0001707
380.00	12.0984	•43297	•12116	•23785	•0001412
400.00	14.9907	•50965	•17032	•27429	•0001025
420.00	19.0099	•61552	•23429	•31573	•0000568
440.00	24.4795	•75659	•31585	•36246	•0000053
460.00	31.7816	•93957	•41807	•41482	0000513
480.00	41.3627	1.17187	•54434	•47313	0001128
500.00	53.7405	1.46165	•69840	•53774	0001794
520.00	69.5108	1.81785	•88428	•60901	0002512
		Propane	e Isotherm at 400 K		
20.00	1.3701	•90830	•06220	•00419	0000017
40.00	2.4992	.82844	•05096	•00928	0000079
60.00	3.4169	•75509	•04103	•01521	0000187
80.00	4.1497	•68776	•03249	•02185	0000331
100.00	4.7273	•62680	•02556	•02903	0000485
120.00	5.1832	•57270	•02030	•03661	0000614
140.00	5.5500	• 52563	•01663	•04451	0000683
160.00	5.8580	48545	•01438	•05273	0000663
180.00	6.1339	•45183	•01341	•06138	0000543
200.00	6.4024	•42445	•01363	•07065	0000332
220.00	6.6855	•40293	•01481	•08080	0000051
240.00	6.9995	•38670	•01676	•09210	•0000278
260.00	7.3657	• 37563	•02017	•10490	•0000628
280.00	7.8224	•37042	•02599	.11964	•0000956
300.00 320.00	8.4288 9.2684	•37253 •38403	•03534 •04956	•13678 •15683	.0001213 .0001360
340.00	10.4538	•40767	•07019	• 18028	•0001360
360.00	12.1307	•44679	•09904	•20756	•0001376
380.00	14.4833	• 50536	.13811	•23907	•0001270
400.00	17.7382	•58798	•18966	•27517	•000736
420.00	22.1696	•69988	•25619	•31618	•0000730
440.00	28.1041	•84690	•34047	•36243	0000114
460.00	35.9271	1.03557	•44557	•41425	0000631
480.00	46.0882	1.27310	•57489	•47197	0001202
500.00	59.1089	1.56747	•73217	•53593	0001202
200.00	J9 6 1 UU 9	1.00/47	• /JZ \ /	00000	10001020

Table 18. (Continued).

Propane Isotherm at 420 K

Density kg/m³	Pressure MPa	Z	Isotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
20.00 40.00 60.00 80.00 100.00 120.00 140.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00 360.00 380.00 400.00 440.00 460.00 480.00 500.00	00 1.4535 .91774 00 2.6834 .84712 00 3.7178 .78245 00 4.5808 .72306 00 5.2994 .66919 00 5.9047 .62136 00 6.4284 .57983 00 6.9013 .54467 00 7.3522 .51579 00 7.8097 .49309 00 8.3002 .47642 00 8.8458 .46543 00 9.4739 .46013 00 10.2307 .46139 00 11.1843 .47078 00 12.4276 .49042 00 14.0824 .52303 00 16.3032 .57187 00 19.2822 .64076 00 23.2533 .73409 00 28.4976 .85681 00 35.3486 1.01448		.06680 .05641 .04723 .03929 .03283 .02796 .02467 .02286 .02248 .02349 .02573 .02904 .03415 .04210 .05404 .07131 .09545 .12823 .17161 .22783 .29937 .38899 .49976 .63510	.00416 .00914 .01489 .02129 .02823 .03561 .04341 .05168 .06052 .07011 .08067 .09248 .10581 .12105 .13860 .15889 .18239 .20950 .24065 .27620 .31651 .36193 .41279 .46944	0000013000006000001380000235000033200004070000425000035300002310000070 .0000120 .0000321 .0000714 .0000671 .0000768 .0000787 .0000787 .0000719 .0000564 .0000326 .0000120000370000081400013170001879
20.00 40.00 60.00 80.00 100.00 120.00 140.00 180.00 200.00 240.00 240.00 280.00 300.00 320.00 340.00 360.00 380.00 400.00 420.00 440.00 460.00 480.00	1.5778 2.9552 4.1590 5.2103 6.1334 6.9573 7.7138 8.4352 9.1539 9.9036 10.7170 11.6234 12.6589 13.8798 15.3655 17.2212 19.5812 22.6127 26.5196 31.5475 37.9881 46.1856 56.5421 69.5247	Propane • 92977 • 87074 • 81697 • 76761 • 72288 • 68332 • 64939 • 62135 • 59937 • 58361 • 57413 • 57080 • 57383 • 58424 • 60365 • 63427 • 67877 • 74031 • 82252 • 92954 1 • 06601 1 • 23713 1 • 44869 1 • 70710	1sotherm at 450 K .07360 .06435 .05620 .04913 .04342 .03924 .03668 .03573 .03643 .03881 .04276 .04817 .05585 .06690 .08254 .10414 .13325 .17159 .22114 .28407 .36286 .46024 .57930 .72344	.00413 .00899 .01455 .02072 .02743 .03464 .04236 .05066 .05965 .06951 .08043 .09265 .10642 .12208 .13996 .16046 .18397 .21090 .24164 .27656 .31603 .36041 .41005	0000010000004200000940000156000021600002820000275000023800001750000007 .0000111 .0000209 .0000286 .0000329 .0000261 .00003600005400005400005400005960001427

Table 18. (Continued).

Propane Isotherm at 500 K

Density kg/m3	Pressure MPa	Z	Isotherm Derivative MPa∙m3/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00 360.00 400.00 420.00 440.00	.00		.08473 .07719 .07759 .06493 .06054 .05771 .05661 .05738 .06015 .06504 .07200 .08100 .09296 .10906 .13061 .15902 .19588 .24294 .30213 .37563 .46589 .57563	.00409 .00882 .01418 .02012 .02660 .03364 .04127 .04958 .05868 .06873 .07992 .09244 .10653 .12248 .14057 .16115 .18455 .21114 .24129 .27535 .31370 .35667	0000006000002600000570000093000012700001550000174000016400001430000113000007900000060000006000000600000226000038400005890000844
		Propane	lsotherm at 550 K		
20.00 40.00 60.00 80.00 100.00 120.00 140.00 180.00 200.00 240.00 240.00 280.00 300.00 340.00 360.00 380.00 400.00 420.00	1.9867 3.8386 5.5794 7.2257 8.7985 10.3270 11.8468 13.3982 15.0258 16.7784 18.7073 20.8623 23.3036 26.1151 29.4069 33.3174 38.0160 43.7061 50.6282 59.0642 69.3419	•95788 •92539 •89671 •87097 •84844 •82986 •81599 •80749 •80497 •80897 •81997 •83823 •86429 •89939 •94524 •00400 1•07820 1•17072 1•28476 1•42389 1•59206	.09569 .08968 .08453 .08027 .07726 .07589 .07643 .07909 .08408 .09161 .10168 .11431 .13052 .15155 .17878 .21368 .25788 .31314 .38142 .46490	.00406 .00872 .01395 .01974 .02608 .03300 .04055 .04883 .05795 .06805 .07932 .09193 .10612 .12212 .14021 .16069 .18387 .21009 .23969 .27301 .31039	00000040000018000003900000630000086000010700001210000130000013200001290000117000011300001160000129000012900002990000286000039400005370000717

Table 18. (Continued).

Propane Isotherm at 600 K

Density kg/m ³	Density Pressure kg/m ³ MPa		Isotherm Derivative MPa•m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
20.00 40.00 60.00 80.00 100.00 120.00 140.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00 360.00 380.00	20.00 2.1893 .96760 40.00 4.2724 .94414 60.00 6.2725 .92409 80.00 8.2055 .90665 100.00 10.0927 .89214 120.00 11.9648 .88135 140.00 13.8605 .87514 160.00 15.8246 .87425 180.00 17.9076 .87940 200.00 20.1653 .89125 220.00 22.6576 .91036 240.00 25.4434 .93710 280.00 32.2042 1.01666 300.00 36.3982 1.07246 320.00 41.3284 1.14162 340.00 47.1796 1.22659 360.00 54.1709 1.33011		• 10653 • 10195 • 09818 • 09529 • 09369 • 09385 • 09610 • 10073 • 10803 • 11825 • 13145 • 14771 • 16811 • 19397 • 22670 • 26786 • 31908 • 38219 • 45915	.00404 .00864 .01378 .01947 .02571 .03254 .04002 .04825 .05734 .06743 .07869 .09130 .10546 .12140 .13939 .15969 .18260 .20843 .23749	00000030000013000002800000460000081000009500001060000114000012800001280000147000016500001920000233000029100003700000474
		Propane	ısotherm at 650 K		
20.00 40.00 60.00 80.00 100.00 120.00 140.00 180.00 200.00 220.00 240.00 280.00 300.00 320.00 340.00 360.00	2.3911 4.7029 6.9585 9.1737 11.3707 13.5823 15.8504 18.2244 20.7606 23.5220 26.5760 29.9908 33.8473 38.2525 43.3420 49.2819 56.2712 64.5440	• 97549 • 95934 • 94630 • 93566 • 92779 • 92353 • 92379 • 92938 • 94109 • 95963 • 98566 1.01962 1.01471 1.17883 1.25661 1.35042 1.46290	•11730 •11406 •11162 •11008 •10990 •11161 •11561 •12226 •13189 •14482 •16114 •18100 •20554 •23612 •27422 •32143 •37945 •45011	.00403 .00858 .01366 .01927 .02542 .03218 .03959 .04776 .05680 .06684 .07805 .09060 .10468 .12051 .13834 .15842 .18103	0000002000001000000220000036000005000000650000010200001140000127000014300001880000223000027000003310000409

Table 18. (Continued).

Propane Isotherm at 700 K

Density kg/m ³	Pressure MPa	Z	lsotherm Derivative MPa∙m³/kg	Isochore Derivative MPa/K	Isochore Curvature MPa/K ²
20.00	2.5922	•98202	•12800	•00402	0000002
40.00	5.1309	•97188	.12604	•00854	0000008
60.00	7.6391	• 96465	•12490	•01356	0000017
80.00	10.1329	•95967	.12468	.01911	0000029
100.00	12.6360	•95739	•12592	•02520	0000041
120.00	15.1834	•95866	. 12920	•03188	0000054
140.00	17.8206	•96443	•13497	•03923	0000067
160.00	20.6015	.97556	•14364	•04733	0000080
180.00	23.5881	•99288	•15561	•05631	0000094
200.00	26.8501	1.01717	•17123	•06629	0000108
220.00	30.4627	1.04912	·19066	.07742	0000125
240.00	34.5027	1.08923	•21408	•08988	0000144
260.00	39.0606	1.13826	•24268	•10385	0000168
280.00	44.2541	1.19749	•27789	•11954	0000198
300.00	50.2304	1.26859	•32123	•13718	0000237
320.00	57.1685	1.35358	•37434	•15703	0000286
340.00	65.2806	1.45473	4 38 94	.17933	0000347

Table 19. The Joule-Thomson inversion locus for propane.

Temp.	Density kg/m3	Pressure MPa
300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 710 720 730 740 750 760 770 780 790 800	491.1 485.4 479.8 474.2 468.6 463.1 457.7 452.3 447.0 441.7 436.5 431.4 426.3 421.2 416.2 411.3 406.3 401.5 396.7 391.9 387.2 382.5 377.9 373.3 368.7 364.1 359.6 355.2 350.7 346.3 341.9 337.5 333.2 328.8 324.5 320.3 311.7 307.5 333.2 328.8 324.5 320.3 311.7 307.5 303.3 299.1 294.9 290.8 286.6 282.5 278.4 274.4 270.3 266.3 262.3 258.4	1.607 4.875 7.952 10.847 13.574 16.143 18.564 20.848 23.001 25.030 26.945 28.749 30.449 32.051 33.558 34.976 36.309 37.561 38.734 39.835 40.862 41.823 42.716 43.549 44.319 44.319 45.031 45.688 46.289 46.839 47.337 47.787 48.191 48.862 49.132 49.363 49.552 49.363 49.552 49.363 49.945 49.899 49.899 49.892 49.814 49.711 49.582 49.430 49.255 49.650 48.846
810	254.4	48.615

Table 20. Thermophysical properties of saturated liquid propane.

		140.0 20	· · · · · · · · · · · · · · · · · · ·	- · · · · ·			aqu.u p.	opano.	
_	_			_				Isochore	Isotherm
Temp.	Ρσ	Pl	ρg	Z L	Zg	dP _O /dT	dPl/dT	Derivative	Derivative
K	MPa	kg/m ³	kg/m ³			MPa/K	$kg/(m^3 \cdot K)$	MPa/K	MPa•m3/kg
85.470	.16895E-09	733.34	.10484E-07	.00000	1.00000	.6882E-10	-1.0311	3.1063	•3013E+01
90.000	.96854E-09	728.67	.57076E-07	.00000	1.00000	•3532E-09	-1.0274	2.9784	•2899E+01
95.000	•54123E-08	723.55	•30216E-06	.00000	1.00000	.1757E-08	-1.0237	2.8469	•2781E+01
100.000	•25139E-07	718.44	•13333E-05	.00000	1.00000	.7304E-08	-1.0205	2.7243	•2670E+01
105.000	•99697E-07	713.34	.50358E-05	.00000	1.00000	.2605E-07	-1.0178	2.6096	•2564E+01
110.000	•34511E-06	708.26	•16639E-04	.00000	1.00000	.8145E-07	-1.0156	2.5020	•2464E+01
115.000	.10618E-05	703.18	•48970E-04	.00000	1.00000	.2273E-06	-1.0140	2.4007	•2368E+01
120.000	.29480E-05	698.12	•13030E-03	.00000	.99999	•5744E-06	-1.0128	2.3051	•2276E+01
125.000	.74804E-05	693.06	•31740E-03	•00000	•99998	• 1331E-05	-1.0122	2.2145	•2188E+01
130.000	•17534E-04	687.99	.71538E-03	•00000	.99996	.2859E-05	-1.0121	2.1287	.2103E+01
135.000	•38316E-04	682.93	■15054E-02	.00000	•99992	.5742E-05	-1.0126	2.0471	.2022E+01
140.000	.78671E-04	677.87	.29807E-02	.00000	.99985	.1087E-04	-1.0136	1.9694	.1943E+01
145.000	• 15279E-03	672.80	.55902E-02	.00001	.99974	. 1950E-04	-1.0152	1.8952	.1867E+01
150.000	.28235E-03	667.72	.99876E-02	.00001	•99957	•3337E-04	-1.0174	1.8243	• 1793E+01
155.000	.49897E-03	662.62	•17085E-01	.00003	•99932	•5475E-04	-1.0203	1.7565	.1722E+01
160.000	.84700E-03	657.51	.28105E-01	.00004	•99896	.8646E-04	-1.0237	1.6915	• 1652E+01
165.000	• 13864E-02	652.38	•44633E-01	.00007	•99847	• 1319E-03	-1.0278	1.6290	• 1585E+01
170.000	.21959E-02	647.23	•68659E-01	.00011	•99781	• 1952E−03	-1.0326	1.5690	•1519E+01
175.000	•33756E-02	642.06	• 10262E+00	.00016	•99695	.2808E-03	-1.0381	1.5112	•1455E+01
180.000	•50497E-02	636.85	•14941E+00	•00023	•99585	•3938E-03	-1.0443	1.4555	•1393E+01
185.000	•73689E-02	631.61	•21243E+00	.00033	•99447	•5398E-03	-1.0513	1.4018	• 1333E+01
190.000	•10512E-01	626.33	•29556E+00	•00047	•99279	•7244E-03	-1.0591	1.3499	•1274E+01
195.000	• 14687E-01	621.02	•40319E+00	•00064	•99076	•9536E-03	-1.0677	1.2997	•1216E+01
200.000	•20133E-01	615.66	•54018E+00	.00087	•98835	•1234E-02	-1.0771	1.2512	•1160E+01
205.000	.27119E-01	610.25	.71191E+00	.00115	•98552	.1571E-02	-1.0875	1.2042	•1106E+01
210.000	.35944E-01	604.78	.92419E+00	.00150	.98223	• 1970E-02	-1.0988	1.1585	.1053E+01
215.000	.46937E-01	599.26	• 11833E+01	.00193	.97847	• 2439 E-02	-1.1111	1.1143	•1001E+01
220.000	•60455E-01	593.67	.14961E+01	.00245	.97418	•2982E-02	-1.1246 -1.1391	1.0713 1.0295	•9500E+00
225.000 231.068	.76884E-01	588.01 581.04	•18696E+01 •24158E+01	•00308 •00400	•96935 •96270	•3604E-02 •4473E-02	-1.1584	•9803	•9006E+00 •8424E+00
235.000	• 12014E+00	576.46	• 28305E+01	•00400	•95791	•5106E-02	-1.1720	•9493	.8056E+00
240.000	•14785E+00	570.55	•34347E+01	•00470	•95125	•5995E-02	-1.1905	•9107	.7599E+00
245.000	.18025E+00	564.55	•41338E+01	.00691	.94393	.6981E-02	-1.2106	•8731	•7155E+00
250.000	•21783E+00	558.44	•49376E+01	•00828	•93593	.8068E-02	-1.2323	•8364	•6722E+00
255.000	.26111E+00	552.22	•58570E+01	.00983	•92720	.9259E-02	-1.2559	.8006	•6301E+00
260.000	•31060E+00	545.88	•69037E+01	.01161	•91774	.1056E-01	-1.2815	.7656	•5892E+00
265.000	.36685E+00	539.41	.80903E+01	.01361	•90752	•1196E-01	-1.3093	.7314	•5495E+00
270.000	.43042E+00	532.78	.94307E+01	.01587	.89651	.1348E-01	-1.3396	•6979	•5109E+00
275.000	.50186E+00	526.00	.10940E+02	.01840	.88470	.1512E-01	-1.3727	•6651	•4735E+00
280.000	.58177E+00	519.05	.12636E+02	.02123	.87206	.1687E-01	-1.4090	•6330	.4373E+00
285.000	.67072E+00	511.91	.14537E+02	.02438	.85858	. 1873E-01	-1.4489	•6015	•4022E+00
290.000	.76931E+00	504.56	• 16665E+02	•02788	.84424	.2072E-01	-1.4930	•5707	•3683E+00
295.000	.87816E+00	496.97	•19045E+02	.03177	.82900	•2284E-01	-1.5420	•5403	•3356E+00
300.000	•99790E+00	489.13	.21704E+02	•03607	.81284	•2508E-01	-1.5966	•5106	•3041E+00
305.000	•11292E+01	480.99	•24676E+02	•04082		.2745E-01	-1.6581	•4813	.2737E+00
310.000	• 12726E+01	472.53	•27999E+02	•04608	•77762	.2995E-01	-1.7278	•4525	•2445E+00
315.000	•14289E+01	463.70	•31720E+02	.05188	•75845	•3259E-01	-1.8078	•4241	•2166E+00
320.000	.15988E+01	454.43	•35898E+02	.05831	.73814	•3538E-01	-1.9004	•3960	•1898E+00
325.000	• 17829E+01	444.67	•40603E+02	•06543	.71658	•3831E-01	-2.0095	•3683	.1642E+00
330.000	• 19822E+01	434.30	.45931E+02	.07335	•69358	.4141E-01	-2.1403	•3409	•1399E+00
335.000	•21973E+01	423.21	•52006E+02	.08220	•66892 64224	.4468E-01	-2.3008 -2.5037	•3136 2865	•1169E+00
340.000 345.000	• 24293E+01	411.22	•59004E+02	.09215	•64224	•4815E-01	-2.5037	•2865 •2592	•9518E-01
350.000	•26792E+01 •29482E+01	398.07 383.34	•67188E+02 •76974E+02	•10347 •11654	•61301 •58039	•5184E-01 •5579E-01	-2.7709 -3.1437	•2317	•7484E-01
355.000	•32377E+01	366.31	.89094E+02	•13205	•54292	•6009E=01	-3.7116	•2035	•3863E-01
360.000	•35498E+01	345.52	• 10505E+03	.15136	• 49781	•6486E-01	-4.7195	•1738	•2308E-01
365.000	•38877E+01	316.85	•12901E+03	.17829	.43786	.7047E-01	-7.2322	.1406	•9697E-02
369.850	•42475E+01	220.49	·22049E+03	.27625	.27625	.8113E-01			0.

Table 20. (Continued).

				lab	16 20. (0	on integ,				
Temp.	Heat of Vap. J/mol	Internal Energy J/mol	Enthalpy J/mol	Entropy J/(mol•K)	C _V J/(mol•K)	C _o J/(mol•K)	C _p J/(mol·K)	Fugacity/ Pressure Ratio	Vel. of Sound m/s	Dielectric Constant
85.470 90.000 95.000	24840.8 24627.8 24397.6	.0 391.6 822.9	.0 391.6 822.9	82.561 87.074 91.767	61.64 61.43 61.22	84.09 84.30 84.54	84.09 84.30 84.54	1.00000 1.00000 1.00000	2027 1994 1959	2.09041 2.08021 2.06918
100.000	24172.3	1253.4 1683.4 2113.2	1253.4 1683.4 2113.2	96.197 100.397 104.394	61.05 60.89 60.77	84.80 85.06	84.80 85.06	1.00000 1.00000 1.00000	1925 1892 1860	2.05836 2.04772 2.03725
110.000 115.000 120.000	23735.1 23522.5 23313.3	2543.0 2973.0	2543.0 2973.0	108.210	60.67 60.59	85.34 85.63 85.94	85.34 85.63 85.94	1.00000	1828 1796	2.02692 2.01673
125.000	23107.3	3403.4 3834.6	3403 • 4 3834 • 6	115.374 118.753	60 • 54 60 • 50	86.26 86.60	86.26 86.60	1.00000	1765 1735	2.00666 1.99670
135.000 140.000	22703.1 22504.2	4266.9 4700.4	4266.9 4700.4	122.013 125.165	60.50 60.51	86.95 87.33	86.95 87.33	•99996 •99988	1704 1674	1.98683 1.97705
145.000	22307.0	5135.5 5572.6	5135.5 5572.6	128.220	60.54 60.60	87.72 88.14	87.72 88.14	•99977 •99958	1644 1614	1.96734 1.95769
155.000 160.000 165.000	21915.9 21721.4 21526.9	6011.8 6453.6 6898.0	6011.9 6453.6 6898.1	134.068 136.877 139.616	60.68 60.77 60.89	88.57 89.03 89.52	88.57 89.03 89.52	•99931 •99891 •99836	1585 1555 1526	1.94810 1.93855 1.92904
170.000	21332.2	7345.5 7796.2	7345.6 7796.4	142.292 144.908	61.03 61.20	90.03 90.56	90.03 90.57	.99760 .99672	1496 1467	1.91955
180.000 185.000	20940.4 20742.4	8250.4 8708.3	8250.7 8708.8	147.471 149.983	61.38 61.59	91.13 91.72	91.14 91.74	.99550 .99409	1438 1409	1.90062 1.89117
190.000 195.000 200.000	20542.6 20340.4 20135.5	9169.9 9635.7 10105.6	9170.7 9636.7 10107.0	152.448 154.870 157.251	61.82 62.07 62.34	92.35 93.01 93.70	92.37 93.03 93.73	•99227 •99017 •98761	1379 1350 1320	1.88170 1.87222 1.86272
205.000	19927.3 19715.5	10579.9 11058.6	10581.9	159.594	62.64 62.96	94 • 43 95 • 20	94.47 95.25	•98470 •98128	1291 1261	1.85319 1.84361
215.000 220.000	19499.6 19279.0	11542.1 12030.1	11545.5 12034.6	164.177 166.421	63.31 63.69	96.00 96.85	96.07 96.94	•97746 •97311	1232 1202	1.83399 1.82430
225.000 231.068 235.000	19053.3 18771.8 18584.5	12523.1 13128.2 13524.2	12528.9 13135.9 13533.4	168.636 171.288 172.987	64.09 64.61 64.97	97.74 98.88 99.66	97.86 99.04 99.85	.96826 .96176 .95713	1172 1136	1.81455 1.80261 1.79481
240.000 245.000	18340.2	14032.5 14546.1	14043.9 14560.2	175.126 177.242	65.45 65.97	100.70 101.79	100.93	•95077 •94392	1112 1082 1052	1.78479 1.77467
250.000 255.000	17828.9 17560.7	15065•4 15590•1	15082.6 15611.0	179.339 181.416	66.51 67.09	102.95 104.16	103.30 104.59	•93661 •92878	1021 991	1.76442 1.75403
260.000 265.000 270.000	17283.0 16995.2 16696.4	16120.7 16657.3 17200.0	16145.8 16687.3 17235.6	183.476 185.519 187.547	67.69 68.34 69.02	105.44 106.80 108.23	105.97 107.44 109.00	•92047 •91173 •90253	960 929 898	1.74349 1.73279 1.72191
275.000 280.000	16385.7 16062.1	17749 • 1 18304 • 7	17791.1 18354.2	189.563 191.566	69.73 70.48	109.75	110.68	.89289 .88286	866 835	1.71082
285.000 290.000	15724.5 15371.6	18867.3 19437.3	18925 . 1 19504 . 5	193.560 195.544	71.28 72.11	113.08 114.91	114.42 116.52	.87244 .86171	803 7 71	1.68795 1.67611
295.000 300.000 305.000	15001.9 14613.9 14205.6	20014.9 20600.7 21195.3	20092.8 20690.6 21298.8	197.523 199.496 201.468	72.99 73.91 74.88	116.87 118.99 121.27	118.81 121.32 124.08	.85061 .83922 .82755	739 706 673	1.66397 1.65149 1.63862
310.000 315.000	13774.8 13318.6	21799.6 22414.5	21918.3 22550.4	203.440 205.417	75.90 76.97	123.76 126.50	127.16 130.62	.81564 .80353	640 606	1.62531 1.61150
320.000 325.000 330.000	12833.7 12315.9 11759.6	23041.1 23680.9	23196.2 23857.7	207.401 209.397	78.10 79.29	129.53 132.94 136.83	134.58 139.17	•79120 •77869 •76602	571 536 501	1.59711 1.58204 1.56616
335.000 340.000	11157.5	24336.0 25008.8 25703.0	24537.2 25237.8 25963.5	211.412 213.454 215.532	80.54 81.86 83.26	141.38 146.85	144.61 151.27 159.69	•75320 •74024	464 427	1.54930 1.53122
345.000 350.000	9769.9 8945.7	26423.6 27178.4	26720.4 27517.6	217.663 219.870	84.74 86.32	153.70 162.81	170.94 187.08	•72714 •71383	388 348	1.51156 1.48975
355.000 360.000 365.000	7985.7 6806.1 5175.8	27981.5 28861.6 29903.9	28371.2 29314.7 30444.9	222.195 224.725 227.718	88.01 89.85 91.80	176.11 198.91 254.84	213.03 263.85 418.67	.70027 .68637 .67194	305 260 210	1.46483 1.43480 1.39412
369.850	0.0	32232.7	33082.2	234.726				.65668	0	1.26352

Table 21. Thermophysical properties of propane along isobars.

	Dielectric Constant	2.09041 2.08022 2.05837 2.05725 2.01674 1.99671 1.97706 1.95770 1.95856 1.91956 1.90063	1000028 100028 1000027 1000027 1000020 1000019 1000019 1000017	00000000000000000000000000000000000000
	Vel. of Sound m/s	2027 1994 1925 1860 1735 1674 1614 1555 1497 1383	200 200 200 200 200 200 200 200 200 200	287 284 284 287 287 287 287 287 287 287 287 287 287
	Fugacity/ Pressure Ratio	.16916E-07 .25160E-05 .25160E-05 .29495E-03 .17545E-02 .78719E-02 .28242E-01 .84648E-01 .21913E+00 .50270E+00	.99262E+00 .99350E+00 .99423E+00 .99483E+00 .99535E+00 .99570E+00 .99680E+00 .99705E+00 .99705E+00 .9978E+00 .9978E+00 .9978E+00 .9978E+00	99854E+00 99863E+00 99871E+00 99887E+00 99897E+00 99997E+00 99910E+00 99910E+00 99910E+00 99910E+00 99910E+00 99956E+00 99956E+00
	Cp J/(mol•K)	84.09 84.30 84.30 85.34 85.34 86.69 87.33 88.14 89.03 90.03	54.75 556.20 559.41 661.11 68.40 72.25 74.20 74.20 76.18 86.11 86.11	90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000
9	Cv J/(mol•K)	61.64 61.43 61.05 60.77 60.59 60.50 60.60 60.77 61.03 61.78	46.21 49.31 50.97 50.97 50.97 50.09 50.01 60.01 60.01 61.93 62.88 63.88 63.88 67.81 77.77	81.71 83.67 85.62 87.55 89.47 91.36 95.24 95.10 96.94 96.94 97.6 100.56 110.87 117.29 117.29 123.36
	Entropy J/(mol•K)	82.562 87.069 96.196 104.395 1118.751 125.165 131.183 136.876 147.472 152.095	260.987 265.831 266.611 277.013 274.651 279.826 282.371 284.893 287.394 289.876 292.341 294.791 297.226 302.058	311.582 311.582 313.936 313.936 313.936 323.938 325.555 325.555 336.923 354.581 354.581 354.581
= 0.01 MPa	Enthalpy J/mol	00000-0000 K	29714.7 50269.3 50269.3 51424.9 52027.4 52027.4 52047.2 53284.8 53940.7 54011.5 5508.8 57505.7 5968.8 59880.2 41562.7	4324.5 44234.5 44234.9 45164.8 46114.0 47082.5 50101.7 51145.2 52207.1 53287.0 55200.3 65031.5 70178.8 81166.1
Isobar at P	inter Ener J/mo		28145.8 29102.3 29102.3 29102.3 30123.2 31215.4 31215.4 32376.8 352376.8 352376.8 352376.8 352376.8 352376.8 352376.0 37866.0	40169.0 40966.1 41842.8 42708.8 44498.3 46363.4 47323.7 48302.3 49299.0 51345.8 55646.6 650211.4 65025.8
Propane 18		2.89916 2.89916 2.66965 2.46362 2.10340 1.94308 1.79319 1.65230 1.51932 1.28232	05555 05727 04111 04482 04683 05063 05073 05012 06391 06391 06391	07178 07526 07526 07715 07715 08093 08282 08471 08460 0849 09038 09038 090416 10171 11682
01701	sochore Derivative MPa/K	3.106272 2.978395 2.724319 2.502046 2.305097 2.128741 1.969421 1.824395 1.691508 1.569029 1.357287	.000053 .000044 .000044 .000044 .000035 .000035 .000035 .000035 .000035 .000036 .000036	000025 000026 000027 000023 000023 000022 000022 000020 000020 000019 000010
apla	2	.00085 .00081 .00074 .00068 .00065 .00059 .00056 .00056 .00056 .00048 .00048	99313 999400 999401 999529 9996619 999619 99776 99776 99776 997807 998807 998807 998807	99871 99887 99886 99888 99904 99913 99926 99944 99953 99966
	ity kg/m3	73334E+03 72868E+03 71844E+03 70826E+03 69812E+03 66772E+03 66772E+03 64724E+03 64724E+03 65752E+03 64724E+03	.28107E+00 .25530E+00 .25530E+00 .22187E+00 .22183E+00 .21288E+00 .21288E+00 .21288E+00 .19700E+00 .19700E+00 .1933E+00 .1719E+00 .1719E+00 .1719E+00 .1719E+00 .1719E+00	13975E+00 13616E+00 12950E+00 12846E+00 12641E+00 12065E+00 11796E+00 11539E+00 11539E+00 11657E+00 10614E+00 98271E-01 91485E-01 85577E-01
	Density mol/L	1663E+02 1652E+02 1629E+02 1606E+02 1560E+02 1560E+02 1514E+02 1491E+02 1444E+02 1444E+02 1422E+02	.6374E-02 .6050E-02 .5758E-02 .5251E-02 .4640E-02 .4467E-02 .450E-02 .4157E-02 .4157E-02 .3888E-02 .3766E-02 .3545E-02	23169E-02 3018E-02 3010E-02 2937E-02 2867E-02 2736E-02 2617E-02 2617E-02 2561E-02 2561E-02 2508E-02 275E-02 277E-02 1827E-02
	Temp.	4771 0000 0000 0000 0000 0000 279	190.000 220.000 220.000 230.000 250.000 250.000 280.000 280.000 340.000 350.000 350.000	

	Dielectric Constant	2.09042 2.05839 2.05839 2.05839 2.01677 1.99674 1.97709 1.91960 1.91960 1.88175 1.86276 1.84363 1.00137	1.00128 1.00113 1.00113 1.00104 1.00097 1.00094	1.00083 1.0008
	Vel. of Sound m/s	2027 2027 1929 1929 1860 1735 1615 1615 1647 1647 1678 1579 1221 1224	22222222222222222222222222222222222222	265 265 272 272 285 285 285 285 285 285 285 285 285 28
	Fugacity/ Pressure Ratio	W = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	97990E+00 98195E+00 9859E+00 98519E+00 98650E+00 98864E+00 98864E+00 99855E+00	99167E+00 99227E+00 99324E+00 99367E+00 99367E+00 99442E+00 99564E+00 99566E+00 99566E+00 99566E+00 99665E+00 99665E+00 99637EE+00 99637E+00 99637E+00 99749E+00 99749E+00
	Cp J/(mol•K)	884.30 86.94 867.30 867.30 867.30 87.30 889.03 97.30 97.20 97.20 97.20 97.20 97.20 97.20 97.20 97.20 97.20 97.20 97.20	65.485 65.17 66.94 66.94 72.53 72.53 74.46	86.25 86.26 86.26 86.26 86.26 90.18 90.19 90.19 90.19 90.19 90.25 100.36 100.36 112.48 112.48 112.48
	Cv J/(mol•K)	61.65 61.65 61.05 60.77 60.51 60.60 60.78 61.38 61.38 61.38 61.38 62.34 62.34	56.78 56	71.83 75.80 75.80 77.79 79.76 83.69 83.69 83.69 83.69 80.48 91.23 80.57 110.88 110.88 1123.36
MPa	Entropy J/(mol•K)	82.562 96.192 104.392 1118.747 125.158 131.179 136.872 142.288 157.445 157.445 157.445 161.899 164.729	258.419 261.085 265.710 266.300 268.860 271.395 273.906 276.398	283.769 286.196 288.611 291.013 293.403 295.782 298.150 300.507 302.853 305.189 307.515 312.137 314.432 316.717 318.992 332.428 341.179 349.761
P = 0.05 M	Enthalpy J/mot	394.2 1256.1 2915.9 2975.6 3837.1 4702.9 5575.1 6456.1 7348.1 8252.9 9172.4 10108.2 11664.8	31948.7 32575.1 33218.2 33878.6 34557.1 35254.1 35969.8 36704.8 3777.9	390.26.4 398.39.6 40672.6 41525.3 42397.7 44201.3 44201.3 44201.3 4401.3 4401.3 40048.1 50074.0 51118.4 52181.0 53261.7 55476.3 65011.8 45150.8
sobar at	Internal Energy J/mol	391.1 1253.0 2112.8 2913.0 4699.6 5571.8 6452.8 7344.7 8249.5 9168.9 10104.6 11057.9	29.14.2 20012.4 31013.1 31146.2 32339.8 32952.1 32552.3 34233.9 34533.3	36302.9 37032.9 37032.9 39338.4 40974.5 41821.8 42548.4 42548.2 43545.2 42479.9 42479.9 42479.9 42479.9 42479.9 42479.9 42479.9 4256.0 49282.2
Propane 1	isotherm Derivative MPa·m3/kg	2.89961 2.89961 2.46408 2.246408 2.246408 2.246408 1.94358 1.94358 1.65282 1.51985 1.51985 1.27447 1.16088 1.05278		06528 06528 06520 06702 07096 07287 07287 07869 08812 08432 08432 08432 08432 08432 08432 08432 08432 08432 08432
	sochore Derivative MPa/K	3.106282 2.978521 2.502201 2.502201 2.502201 2.502201 1.969606 1.824588 1.691709 1.569239 1.455769 1.251366 1.158632 1.103638	.000225 .000225 .000205 .000197 .000189 .000175	.000144 .000144 .000144 .000135 .000123 .000123 .000112 .000103 .000100 .000100 .000100 .0000003 .0000003 .0000003 .0000003
	2	.00423 .00404 .00369 .00340 .00317 .00279 .00279 .00252 .00261 .00273 .00273 .00273 .00273	98112 98321 98495 98445 98643 98643 98860 98976 99976 99976	99261 99362 99445 99445 99445 99571 99571 99661 99661 99679 99771 99678 99771 99878 99878
	sity kg/m3	Kg/mb 73335E+03 72869E+03 71846E+03 60802E+03 66802E+03 66774E+03 66774E+03 66774E+03 66774E+03 66774E+03 66774E+03 66774E+03 66774E+03 66774E+03 6726E	11752E+01 11752E+01 11758E+01 10769E+01 10340E+01 99439E+00 9258E+00 89238E+00 86289E+00	80957E+00 76258E+00 74103E+00 74103E+00 72071E+00 68328E+00 664958E+00 64958E+00 65395E+00 65395E+00 65395E+00 65395E+00 65395E+00 65396E+00 653174E+00 65594E+00
	Density mol/L	1652E+02 1652E+02 1652E+02 1652E+02 1660E+02 1560E+02 1550E+02 1514E+02 1491E+02 1491E+02 1444E+02 1444E+02 1446E+02 145	2.7/9.5e-01 2.2645E-01 2.2442E-01 2.2345E-01 2.275E-01 2.2095E-01 1.957E-01	1836E-01 1781E-01 1680E-01 1634E-01 1591E-01 1591E-01 1438E-01 1438E-01 1438E-01 1372E-01 1372E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01 1285E-01
	Temp.		220,000 240,000 240,000 250,000 260,000 270,000 280,000 310,000	

	МРа
ontinued)	= 0.101325
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	to
Table 21	Isobar
-	Propane

ielectric Constant	2.09044 2.08027 2.05842 2.05842 2.05731 2.01681 1.99678 1.95779 1.95779 1.99074 1.88182 1.86283 1.8437 1.80473	1.000254 1.000257 1.000257 1.000252 1.000252 1.00198 1.00198 1.00198 1.00198 1.00159 1.00159 1.00159 1.00159 1.00159 1.00139 1.00139 1.00139 1.00139 1.00139 1.00130 0.00000 0.00000 0.00000
Vel. of Sound D m/s	2027 1994 1925 1860 1797 1735 1615 1615 1556 1497 1262 1202 1202	218 222 222 231 231 231 231 231 231 232 232
Fugacity/ Pressure Ratio	. 16883E-08 . 96416E-08 . 24999E-06 . 34288E-05 . 29278E-04 . 17410E-03 . 78087E-03 . 21722E-01 . 49873E-01 . 10535E+00 . 19688E+00 . 34902E+00 . 34902E+00 . 98157E+00 . 98157E+00	96176E+00 96545E+00 9749E+00 97192E+00 97448E+00 97672E+00 986192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98192E+00 98196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00 99196E+00
Cp J/(mol•K)	84.09 84.30 84.30 85.34 85.34 87.52 88.13 89.03 90.03 91.13 92.36 93.72 96.93	63.40 64.51 65.99 67.61 72.94 74.82 76.72 78.65 80.59 82.54 84.49 86.45 88.40 90.35 92.29 94.21 96.13 99.91 101.78 103.62 112.56 112.56
Cv J/(mol•K)	61.65 61.05 60.05 60.05 60.05 60.05 61.38 62.35 62.35 63.69	55.73 56.73 56.73 56.73 60.29 60.29 60.29 60.29 60.29 60.39 60.39 60.39 71.88
Entropy J/(mol•K)	82.563 87.061 96.188 104.387 111.856 118.742 125.153 142.282 147.462 157.241 157.241 161.893 166.414	252.527 254.951 260.233 262.816 265.370 267.897 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 277.885 287.460 289.655 291.296 291.296 291.296 301.805 317.605 317.605 317.605 317.805 317.805
Enthalpy J/mol	6.2 396.9 1258.8 2118.6 2978.2 3839.8 4705.5 577.7 6458.7 7350.6 8255.4 9174.9 10110.5 11063.9 12036.1	31907.6 32478.6 33130.9 33488.8 34483.4 35185.5 35905.7 36644.5 37402.2 38179.0 38179.0 44162.0 44162.0 4504.5 46046.2 47017.0 48006.7 49015.1 50042.2 51087.5 51087.5 51087.5 51087.5 64989.6 775526.5 81133.9
Internal Energy J/mol	390.7 1252.5 2112.3 2971.8 3833.3 4698.9 5571.0 6451.9 7343.7 8248.4 9167.7 10103.3 11056.5 13020.8	30058.1 30549.4 31113.6 31594.0 32291.7 32291.7 325541.6 34194.6 34566.8 34566.8 34566.8 41796.6 41796.6 41796.6 44456.3 455514.7 45353.0 45353.0 45353.0 45353.0 46323.6
	3.01348 2.90019 2.67070 2.46468 2.27714 2.10451 1.94421 1.55349 1.55349 1.52053 1.37519 1.05354 2.95061 88256	.04036 .04230 .04443 .04652 .04858 .05062 .05663 .05663 .05663 .05647 .06472 .06472 .07231 .0
lsochore Derivative MPa/K	2.978683 2.724643 2.502400 2.305475 2.129141 1.969842 1.824835 1.569508 1.456050 1.350429 1.251672 1.071560 988876	.000473 .000473 .000428 .000409 .000361 .000356 .000356 .000356 .000356 .000287 .000287 .000257 .000257 .000257 .000287 .000287 .000287 .000287 .000287 .000287 .000287 .000287 .000287 .000279 .000278 .000278 .000278 .000278
7	.00857 .00819 .00690 .00691 .00641 .00566 .00537 .00511 .00452 .00452 .00423 .00423	96270 96677 97626 97851 97851 98046 98364 98811 98811 99816 99811 999161 99161 99347 99385 99385 99385 99385 99385 99482 99482 99482 99586
:i+y kq/m3	7336E+03 77836E+03 77847E+03 70830E+03 69816E+03 68804E+03 67772E+03 66777E+03 66777E+03 64730E+03 64730E+03 64592E+03 65928E+03 59371E+03	22158E+01 22161E+01 22149E+01 221229E+01 19614E+01 18900E+01 18239E+01 17623E+01 17623E+01 17653E+01 17653E+01 17654E+01 16514E+01 16514E+01 16514E+01 16514E+01 16539E+01 16539E+01 16539E+01 1759E+
Density mol/L	1663E+02 1653E+02 1629E+02 1606E+02 1583E+02 1560E+02 157E+02 1448E+02 1448E+02 1444E+02 1439E+02 1372E+02 1431E+02 1436E+02 1372E+02	5478E-01 5252E-01 4814E-01 4623E-01 4448E-01 4286E-01 4286E-01 3866E-01 3866E-01 3745E-01 3745E-01 3728E-01
Temp.	85.479 90.000 110.000 120.000 150.000 150.000 170.000 170.000 180.000 190.000 220.000 230.000 231.068	231.068 240.000 250.000 260.000 270.000 280.000 350.000 350.000 350.000 350.000 350.000 350.000 360.000 360.000 410.000 420.000 440.000 450.000 450.000 450.000 450.000 660.000

	Dielectric Constant	2.09046 2.08030 2.05845 2.01684 1.99682 1.97718 1.95783 1.95783 1.95783 1.96079 1.88188 1.86188 1.86188 1.86188 1.86446 1.86483	1.00380 1.00347 1.00347 1.00333 1.00236 1.00276 1.00276 1.00276 1.00230 1.00243 1.00243 1.00243 1.00243 1.00243 1.00207 1.00201 1.00200 1.0020
	Vel。 of Sound m/s	2027 1995 19860 1797 1735 1615 1615 1615 1615 1730 1730 1730 1730 1730 1730 1730 1730	224 2224 2234 2234 2234 2234 2234 2234
	Fugacity/ Pressure Ratio	.11472E-08 .65386E-08 .23238E-05 .19838E-04 .11798E-03 .52892E-03 .52892E-02 .56832E-02 .56832E-02 .56832E-01 .33731E-01 .33731E-01 .33731E-01 .33731E-01 .33731E-01	95030E+00 95536E+00 96534E+00 96681E+00 96681E+00 97216E+00 97216E+00 97438E+00 97635E+00 97855E+00 98556E+00 98556E+00 98561E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 98556E+00 9856E+00 98556E+00 98577E+00 98577E+00 99577E+00 99577E+00
	Cp J/(mol•K)	84.09 84.30 84.30 85.34 85.93 86.03 90.02 92.35 92.35 92.35 92.35 96.92	65.92 66.98 68.37 71.62 77.06 78.94 80.85 82.77 80.85 80.85 80.51 90.51 90.51 100.02 101.88 102.54 102.54 103.88 103.88 112.63 112.63 113.88 113.88 114.88
	Cv J/(mol•K)	61.65 61.44 61.05 60.77 60.60 60.78 60.78 61.39 61.39 62.97 62.97 63.69	55.70 58.74 60.49 62.32 64.19 66.10 68.03 68.03 68.03 68.03 68.03 68.03 68.03 69.98 77.87 77
0.15 MPa	Entropy J/(mol•K)	82.563 87.057 96.184 104.383 111.85.23 125.149 131.169 136.861 142.277 147.456 152.433 152.433 152.433 170.815 175.125	251.508 254.120 256.773 259.383 261.956 264.500 274.449 276.891 279.318 281.732 286.520 288.896 291.260 298.287 298.287 300.608 302.918 307.507 309.786 314.312 349.3239 349.286
II C	Enthalpy J/mol	9.1 1261.3 2121.2 2980.8 3842.3 4708.0 5580.2 6461.2 7353.1 8257.8 9177.2 11066.1 12038.2	32403.0 33043.5 34411.6 35119.3 35844.3 36587.2 38128.4 38128.4 38128.4 38128.6 41439.6 42311.2 44125.9 46012.9 46012.9 46012.9 46012.9 46012.9 46012.9 46012.9 46012.9 46012.9 46012.9 46012.9 47210.0 57206.5
	Internal Energy J/mol	390.4 1252.1 2971.3 2971.3 3832.7 4698.3 5570.3 5570.3 5570.3 1742.8 8247.4 9166.6 10102.1 11055.1 12027.1 14032.4	30503.0 31055.3 31655.3 32244.3 32863.8 33501.2 34156.9 34831.4 35255.0 35237.9 36937.3 3693.3 40924.2 41773.3 42641.6 43528.9 47265.8 47265.8 48246.0 49244.2 51293.7 55599.1 60167.8
Propane	lsotherm Derivative MPa·m3/kg	3.01391 2.90074 2.65725 2.46525 2.07771 2.194482 1.79497 1.65412 1.52118 1.52532 1.27587 1.16232 1.05426 .95135 .85333	.04089 .04510 .04511 .05171 .05178 .05583 .05583 .05588 .05786 .05888 .06786 .06786 .07776 .07767 .07767 .07767 .07776 .077776 .07776 .07776 .07776 .07776 .07776 .07776 .07776 .07776 .077776 .07776 .077776 .077776 .077776 .077776 .077776 .077776 .0777776 .077776 .077776 .077776 .0777777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .077777 .0777777 .0777777 .0777777 .077777 .077777 .077777 .0777777 .0777777 .077777 .0777777 .077777777
	lsochore Derivative MPa/K	3.106305 2.978837 2.5724816 2.502589 2.1025677 2.129355 1.970066 1.825070 1.692212 1.569763 1.456315 1.456315 1.251962 1.159266 1.251962 1.071880 989213	.000691 .000654 .000651 .000505 .0005054 .000505 .000471 .000478 .000478 .000478 .000478 .000478 .000393 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364 .000364
	Z	01269 011213 01107 000950 000950 000838 000756 000723 000668 000668 000668 000668	95075 95648 96134 96539 97653 97176 97653 97653 97653 988021 988174 98821 98897 98897 98897 999656 99193 99282
	Density kg/m3	.7337E+03 .72873E+03 .72873E+03 .70832E+03 .69818E+03 .68807E+03 .65780E+03 .65780E+03 .65760E+03 .65760E+03 .6564E+03 .62644E+03 .60489E+03 .59376E+03 .59376E+03	3,34813E+01 3,53270E+01 3,0521E+01 2,28230E+01 2,28230E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,24594E+01 2,1819E+01 2,1826E+01 1,1832E+01 1,1745E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1774E+01 1,1737E+01
	Dens mol/L	1663E+02 1629E+02 1629E+02 1606E+02 1583E+02 1550E+02 1514E+02 1491E+02 144E+0	7595E-01 6620E-01 6650E-01 6650E-01 6650E-01 6576E-01 5576E-01 5576E-01 5576E-01 5776E-01 4813E-01 4813E-01 4813E-01 4813E-01 4813E-01 4813E-01 4813E-01 3786E-01 3786E-01 3786E-01 3786E-01 3786E-01 3786E-01 3786E-01 3786E-01 3786E-01
	Temp.	85.484 90.000 100.000 110.000 120.000 150.000 160.000 170.000 170.000 190.000 220.000 230.000 240.356	240,356 250,000 260,000 280,000 280,000 390,000 310,000 350,000 350,000 350,000 350,000 420,000 440,000 450,000 450,000 450,000 450,000 450,000 450,000 660,000

	Dielectric Constant	2.09047 2.08033 2.05848 2.05848 2.01688 1.99686 1.97722 1.95788 1.95788 1.95788 1.95788 1.9885 1.88194 1.86297 1.84386 1.84386 1.84386 1.84490	1.00498 1.00449 1.00449 1.00414 1.00384 1.003384 1.00359 1.00359 1.00356 1.00356 1.00356 1.00356 1.00270 1.00270 1.00264 1.00258 0.00000 0.00000 0.00000 0.00000
	Vel. of Sound m/s	2027 1995 1926 1860 1735 1615 1675 1615 1530 1380 1380 1263 1203 1143 1083	220 222 222 232 235 241 241 245 245 265 265 265 267 273 273 273 273 273 273 273 273 273 27
	Fugacity/ Pressure Ratio	.86572E-09 .49238E-06 .12758E-06 .1488E-05 .14926E-04 .39780E-03 .14264E-02 .1057E-01 .25357E-01 .25357E-01 .25581E-01 .1057E-01 .25581E-01 .1057E-01 .25581E-01 .1057E-01 .25581E-01 .25581E-01 .25581E-01 .25581E-01 .25581E-01 .25581E-01 .25581E-01	94157E+00 94750E+00 94750E+00 95254E+00 96396E+00 96396E+00 96396E+00 97737E+00 977379E+00 97739E+00 97739E+00 97739E+00 97739E+00 97739E+00 98725E+00 98156E+00 98156E+00 98566E+00 98566E+00 98725E+00 98725E+00 98725E+00 98725E+00 98725E+00 98725E+00 98726E+00 98726E+00 98726E+00 98726E+00 98726E+00 98726E+00 98726E+00 98726E+00
	Cp J/(mol•K)	84.09 84.09 84.30 85.74 885.34 887.32 887.32 90.00 90.32 90.00 90 90.00 90.00 90.00 90.00 90.00 90.00 90.00 90.00 90.00	68.28 70.69 70
	Cv J/(mol•K)	61.65 61.44 61.05 60.78 60.51 60.52 60.51 60.78 61.39 61.39 62.35 62.35 62.35 65.45	57.35 57.63 57.63 59.10 60.75 66.22 68.13 70.07 72.02 72.02 72.98 81.83 81.83 83.78 87.64 87.64 97.17 97.00 98.82 110.91 117.32
, a	Entropy J/(mol•K)	82.564 87.053 96.179 104.379 111.847 118.733 125.144 131.164 136.272 147.451 152.427 157.229 161.879 166.400 170.807	250.840 251.465 251.465 251.465 250.803 259.401 261.964 264.498 267.007 269.494 271.962 270.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 281.672 279.266 279.26
= 0.2 MPa	Enthalpy J/mol	12.2 402.1 1264.0 2123.8 2983.4 3844.9 4710.6 5582.8 6463.7 7355.5 9179.6 10115.1 11068.3 12040.4 13032.5 14045.9	32791.9 322947.5 33635.1 35049.5 35049.5 35052.7 38076.2 38878.2 38878.2 40538.8 41397.7 42275.8 45024.9 45979.4 46952.7 48955.4 48955.4 48955.7 52097.1 53180.4 55399.8 60044.0 64950.5 70105.2
sobar at	Internal Energy J/mol	390.0 1251.7 2111.3 2970.8 2832.1 4697.6 5569.6 6450.3 7341.9 8246.4 9165.5 11053.7 12025.5 14030.5	30856.5 30990.5 31585.0 32193.3 324194.5 344117.4 35205.2 36939.2 36939.2 36939.2 36939.2 441749.6 41749.6 42618.8 42618.8 42618.8 42618.8 42618.8 42505.9 36939.7 46283.9 46283.9 46283.9 46283.9 46283.9 51276.4 60153.5
Propane 19	lsotherm Derivative MPa•m3/kg	3.01435 2.90130 2.67182 2.46583 2.27831 2.10570 1.94544 1.79560 1.65477 1.52185 1.39600 1.27657 1.16304 1.05499 .95211 .85411	04109 04165 04404 04633 04856 05074 05508 05709 05729 06528 06528 06528 06528 06528 06729 07724 07724 07724 07724 07724 07920
	sochore Derivative MPa/K	3.106317 2.978995 2.724994 2.502783 2.305884 2.129574 1.970296 1.825311 1.692463 1.570025 1.456588 1.252260 1.159569 1.072208 989559 989559	000917 000904 000853 000772 000773 000773 000773 000773 000773 000773 000773 000773 000773 000773 000773 000774 000774 000774 000774 000775 000774 000775 000775 000775 000776 000777 000776
	2	01692 01476 01361 01361 01186 01118 01059 01008 000964 000925 000891 000812 000812 000812	93367 94147 94147 94141 95278 9624 9624 97188 97188 97188 97972 98252 98252 98373 98373 98976 98834 98976 98976 98976 98976 98976 98976 98976 98976 98976 98976 98976 99976 99976
	sity kg/m3	73338E+03 72874E+03 71851E+03 70834E+03 69821E+03 66789E+03 66783E+03 66783E+03 66783E+03 66784E+03 65699E+03 62648E+03 62648E+03 5589E+03 62648E+	45569E+01 45067E+01 43019E+01 3519E+01
	Density mol/L	1663E+02 1653E+02 1629E+02 1606E+02 1583E+02 1587E+02 1514E+02 1491E+02 1491E+02 1445E+02 145E+02 145E+02 145E+02 145E+02 137E+02 137E+02 137E+02 137E+02 137E+02	1023E+00 9755E-01 9860E-01 8815E-01 8815E-01 8829E-01 7735E-01 7735E-01 7735E-01 7735E-01 7747E-01 6626E-01 66443E-01 5564E-01 5564E-01 5564E-01 5564E-01 5568E-01 5568E-01 7484E-01 7365E-01 7365E-01 7365E-01 7365E-01 7365E-01
	Temp.	85.489 90.000 110.000 120.000 150.000 150.000 160.000 170.000 190.000 200.000 220.000 240.000	247,717 250,000 220,000 290,000 310,000 310,000 350,000 350,000 350,000 350,000 350,000 350,000 420,000 420,000 420,000 420,000 420,000 420,000 420,000 450,000 450,000 560,000 560,000

O		
Dielectri Constant	2.09051 2.08038 2.05854 2.05745 2.01695 1.99797 1.95797 1.9885 1.88207	1000730 1000736 10006633 10006633 10006633 10006633 10006633 10006663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 1000663 100063 10
Vel. of Sound m/s	2027 1995 1926 1926 1797 1736 1616 1557 1618 1557 1440 1381 1263 1204 11444 1083	222 222 232 232 242 242 242 253 263 263 275 275 275 275 275 275 275 275 275 275
Fugacity/ Pressure Ratio	\$8425E-09 \$3092E-08 \$8580E-07 \$1173E-05 \$10014E-04 \$59499E-03 \$95598E-03 \$95598E-03 \$28631E-02 \$74071E-02 \$74071E-02 \$74071E-02 \$74071E-01 \$75211E-01	922206+00 93736=00 93736=00 94301E+00 94301E+00 94794E=00 95226E+00 95256E+00 95256E+00 95256E+00 95756E+00 9770E+00 9770E+00 9770E+00 9770E+00 9770E+00 97845E+00 97845E+00 97995E+00 97995E+00 97995E+00 98505E+00 98505E+00 98505E+00 98505E+00 98505E+00 98505E+00 98505E+00 98505E+00 98505E+00 98505E+00
Cp J/(moleK)	84.09 84.30 84.30 85.33 85.33 85.93 86.02 89.02 90.01 92.33 95.89 100.89 100.89	71.87 72.56 77.50 77.50 77.50 77.50 77.50 77.50 77.50 77.50 89.50 80 80 80 80 80 80 80 80 80 80 80 80 80
Cv J/(mol•K)	61.66 61.44 60.06 60.78 60.60 60.52 60.79 61.39 61.39 61.39 62.35 62.98 62.98 63.70 65.46 65.51	60.00 60.11 61.43 63.01 64.72 66.52 66.52 68.38 74.13 76.07 79.97 79.97 79.97 85.78 85.78 87.70 89.60 91.49 97.04
Entropy J/(mol•K)	82.565 87.044 96.171 104.370 111.838 118.723 125.134 131.15.846 147.439 157.216 157.216 157.216 157.216 157.216 157.216 157.216 157.216 157.216 157.216	250.013 255.018 255.018 255.018 260.856 260.856 260.856 260.856 275.395 275.395 275.36 280.565 280.565 280.565 280.565 280.565 280.664 280.665
Enthalpy J/mol	18.3 407.4 1269.2 2129.0 2988.6 3850.1 4715.7 4715.7 5587.9 6468.7 7360.5 8265.1 10119.8 11014.4 112044.7 13036.6 14049.7	33376.8 334402.5 35466.1 35646.1 35646.1 35646.1 37178.7 37178.6 39605.3 41017.2 44017.2 44017.2 449928.0 50977.2 55352.3 64913.0 64913.0 75463.9
Internal Energy J/mol	389.2 1250.8 22110.4 2269.7 3830.9 4696.2 5568.1 6448.6 7340.1 6448.6 13098.3 11051.0 12022.4 13013.9 14026.6 15061.8	31396.3 32083.3 322083.3 33369.0 334035.1 334035.1 35418.4 356138.6 400117.5
lsotherm Derivative MPa·m3/kg	3.01523 2.90242 2.67297 2.46700 2.27950 2.10692 1.9468 1.79687 1.65607 1.27797 1.16447 1.05647 1.05647 1.05647 1.05647 1.05647 1.05647 1.05647 1.05647 1.05647 1.05647 1.05647	.04099 .04127 .04588 .04636 .04636 .05105 .05105 .05522 .05770 .05985 .06108 .06108 .07029 .0
lsochore Derivative MPa/K	3.106340 2.979311 2.725350 2.506299 2.130012 1.970757 1.825792 1.692966 1.570549 1.457134 1.570549 1.457134 1.252855 1.160192 1.072864 990251 911808 837039	.001378 .001368 .001123 .001124 .001102 .001014 .000976 .000942 .000981 .000981 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000782 .000781 .000782
7	.02537 .02426 .02214 .01899 .01779 .01518 .01518 .01522 .01522 .01252 .01278 .01278 .01278 .01278 .01278	91973 92081 93025 93796 94440 95455 95219 965219 97280 97280 97280 97280 97280 97280 97280 97280 97280 97280 97280 97280 97280 97290 97290 9720 9720 9720 9720 9720 9
sity kg/m3	.7341E+03 .72878E+03 .71855E+03 .6082E+03 .6082E+03 .66780E+03 .65769E+03 .65769E+03 .65769E+03 .65769E+03 .65769E+03 .65769E+03 .65769E+03 .65769E+03 .65766E+03 .65766E+03 .65766E+03 .65766E+03 .65766E+03 .65851E+03 .59392E+03 .59392E+03 .59392E+03 .59392E+03	.66799E+01 .66459E+01 .66348E+01 .65348E+01 .58096E+01 .55836E+01 .5510E+01 .48478E+01 .44557E+01 .44557E+01 .44557E+01 .44557E+01 .44557E+01 .3561E+01 .3561E+01 .3569E+01
Dens mol/L	1663E+02 1629E+02 1629E+02 1638E+02 1583E+02 1581E+02 1491E+02 1491E+02 1445E+02 1445E+02 1445E+02 1445E+02 1445E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02 137E+02	15155+00 15075+00 13745+00 121655+00 12195+00 12195+00 11365+00 11365+00 10355+00 10355+00 10355+00 10355+00 10355+00 10355+00 10355+00 10555
Temp.	85.498 90.000 100.000 110.000 120.000 140.000 150.000 150.000 170.000 180.000 220.000 220.000 220.000 250.000 250.000 250.000	258.983 260.000 270.000 280.000 280.000 300.000 310.000 350.000 350.000 350.000 350.000 410.000 440.000 450.000 450.000 450.000 450.000 650.000 660.000
	lsochore lsotherm internal pensity Z Derivative Derivative Energy Enthalpy Entropy Cv Cp Pressure mol/L kg/m³ MPa/K MPa•m³/kg J/mol J/mol•K) J/(mol•K) J/(mol•K) J/(mol•K) J/(mol•K) J/(mol•K)	Density Density Berivative Internal

(Continued)	P = 0.4 MPa
	4
Table 21	Propane Isobar

Dielectric	2.09054 2.0844 2.0860 2.03751 2.01702 1.97739 1.95806 1.95806 1.91998 1.91998 1.91998 1.86220 1.86325 1.86325 1.86326 1.86326 1.86336 1.86336 1.86530 1.7648 1.7648	1,00961 1,00949 1,00863 1,00863 1,00764 1,00756 1,00736 1,00736 1,00688 1,00646 1,00646 1,00646 1,00676 1,00676 1,00571 1,00571 1,00571 1,00571 1,00571 1,00571 1,00571 1,00571 1,00571 1,005000 0,00000 0,00000 0,00000 0,00000
Vel. of Sound	2028 1995 1926 1861 1736 1616 1616 1616 1616 1616 1616 16	222 222 223 233 243 243 244 244 244 244
Fugacity/ Pressure Ratio	44358E-09 -25020E-08 -64736E-07 -88639E-06 -75580E-05 -44899E-04 -20113E-03 -21582E-02 -21582E-02 -12796E-01 -2552E-01 -2	90685E+00 90920E+00 92565E+00 93223E+00 93223E+00 94755E+00 94755E+00 94755E+00 95156E+00 95156E+00 96394E+00 96394E+00 96394E+00 97739E+00 97739E+00 97838E+00 97705E+00 97838E+00 97705E+00 9788815E+00 997707E+00 997707E+00
Cp (Sp)/1	84.09 84.79 84.79 85.33 86.58 87.31 88.12 88.12 89.00 91.10 92.32 95.19 96.87 96.87	75.17 75.55 76.55 77.78 80.81 80.81 82.47 84.20 85.97 95.28 95.12 96.97 96.97 96.97 96.97 96.97 96.97 96.97 100.63 100.63 113.02 113.02 113.02 113.02
\$ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		62.40 65.20 66.89 66.89 66.89 77.50 77.50 76.21
Entropy [//molek)		249, 506 250, 891 255, 891 255, 891 256, 746 263, 286 263, 286 265, 798 275, 628 275, 628 275, 628 275, 628 275, 628 282, 826 282, 826 283, 826 283, 826 283, 826 284, 826 284, 826 285, 197 287, 556 287, 556 287
= 0.4 MPG Enthalpy	4707876085015707975	33816.9 35991.1 34743.9 35503.9 36275.2 37060.1 37860.2 39509.9 40360.7 41229.4 41229.4 41229.4 42116.2 43021.4 43944.9 44886.9 44886.9 44886.9 44886.9 44882.3 59923.6 51992.9 53079.8 55951.2 579
iobar at p Internal Energy 1/mol	388.5 1250.0 2109.4 2968.6 3829.6 4694.9 7338.2 6566.6 647.0 10095.8 11048.2 12019.3 14022.7 15010.4	31810.0 31960.1 32611.4 33273.0 33948.1 34638.5 36069.8 36069.8 37572.5 39149.7 40801.0 41655.2 44528.1 44528.1 44528.1 44528.1 44528.1 44528.1 44528.1 44528.1 44528.1 44655.2 47170.6 66098.5 66098.5 669979.5
	2.90355 2.90355 2.90355 2.90355 2.28069 2.10813 1.79814 1.52451 1.52451 1.27937 1.05795 .95515 .95515 .95503	04053 04101 04401 04401 04914 05392 05847 06689 06717 06717 0739 07347 0739 0737 08168 08175 08175 08175 11538
sochore Derivative MDa/K	664 227 227 255 568 668 668 668 668 70 71 71 70 70 70 70 70 70 70 70 70 70 70 70 70	.001856 .001703 .001703 .001525 .001725 .001392 .0011285 .001128 .00108974 .00108974 .0009949 .0009949 .0009949 .0009965 .00099663 .00099663 .00099663 .00099663 .00099663 .00099663 .00099663 .00099663 .00099663 .00099663
7	03383 03234 02252 02522 02535 02371 02235 01927 01782 01782 01782 01583 01583	90171 90471 92523 93295 93295 93951 95005 95433 9543 96955 97770 97770 97770 97770 97770 97770 97870
i ty 1.2/2./23	.37.73 .72342E+03 .72841E+03 .70842E+03 .69829E+03 .68818E+03 .67807E+03 .6779E+03 .65794E+03 .657149E+03 .65713E+03 .657149E+03 .657149E+03 .657149E+03 .657149E+03 .657149E+03 .657149E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03 .65764E+03	87892E+01 86848E+01 79065E+01 75798E+01 72840E+01 72840E+01 65382E+01 65382E+01 65382E+01 65380E+01 57725E+01 57725E+01 57725E+01 57725E+01 57725E+01 57725E+01 57725E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 5773E+01 7873E+01 7873E+01 7873E+01 7873E+01
Density	000000000000000000000000000000000000000	1993E+00 1969E+00 1793E+00 1719E+00 1551E+00 1531E+00 1435E+00 1435E+00 1390E+00 1272E+00 1272E+00 1174E+00 1174E+00 1174E+00 1174E+00 1174E+00 1174E+00 1174E+00 1174E+00 1174E+00 1175E+00 1175E+00 1175E+00 1176E+00 1177E+
Temp。	5507 5000 5000 5000 5000 5000 6000	267,682 270,000 280,000 290,000 310,000 3310,000 3310,000 340,000 350,000 410,000 440,000 440,000 440,000 440,000 440,000 440,000 440,000 560,000 560,000

	Dielectric Constant	2.09057 2.09057 2.09057 2.05867 2.05867 1.959158 1.959159 1.959159 1.959159 1.959159 1.959159 1.05900 1.00090 1.000900 1.0	0.000000
	Vel. of Sound [m/s	2028 1996 11861 17398 11861 17398 1739 1739 1739 1739 1739 1739 1739 1739	372
	Fugacity/ Pressure Ratio	250173 250273 250173 261027	.99259E+00
	Cp J/(mol•K)	88 88 88 88 88 88 88 88 88 88 88 88 88	143.11
	Cv J/(mol•K)		134.51
	Entropy J/(mol•K)		347.146
= 0.5 MPa	Enthalpy J/mol		81024.8
Isobar at P	Internal Energy J/mol	28282828282828282828282828282828282828	37
Propane 19	lsotherm Derivative MPa∘m3/kg	2.01698 2.01688 2.0	.13072
	Isochore Derivative MPa/K	2.979943 2.979943 2.979943 2.971694 1.971677 1.826755 1.693970 1.571595 1.074173 991632 913271 991632 901632 001984 001984 001984 001984 001984 001984 001986 001987 001987 001987 001987 001988 0011113 001169 0011113 001169 0011113	.000727
	7	04228 03403 03403 03403 03403 035403 02520 02520 02520 02520 02520 02520 02520 01935 01843 01844 01844 01846 01846 01846 01846 01846 01846 01846 01847 01846 0	.99442
	114 kg/m3	73345E+03 72885E+03 70846E+03 68823E+03 66789E+03 66799E+03 66799E+03 66799E+03 66799E+03 66799E+03 66799E+03 66799E+03 66799E+03 66799E+03 66799E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+03 6679E+01 77351E+01 77351E+01 77351E+01 77351E+01 6688E+01 6688E+01 66883E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E+01 66884E	.38096E+01
	Density mol/L		.8639E-01
	Temp.		700.000

Table 21. (Continued)
Propane Isobar at P = 0.6 MPa

Dielectric Constant	2.09061 2.08055 2.05875 2.05875 2.01717 1.99717 1.95824 1.95824 1.95824 1.86353 1.86353 1.86353 1.76522 1.76522 1.76522 1.76524 1.76524 1.76524	1.01426 1.011234 1.011234 1.011234 1.01034 1.01036 1.00928 1.00809 1.0
Vel. of Sound m/s	2028 1996 1927 1862 1737 1617 1617 1558 1500 1440 1383 1265 1147 1086 1025 900 900 835	219 225 227 227 227 227 227 227 237 237 237 237
Fugacity/ Pressure Ratio	30304E-09 16952E-08 43799E-07 59903E-06 51028E-05 30283E-04 13560E-03 14554E-02 37574E-02 37574E-02 17842E-01 53970E-01 50180E-01 53843E+00 23843E+00 23843E+00 60180E-01	88066E+00 89119E+00 90123E+00 90993E+00 92426E+00 93502ZE+00 9460E+00 9460E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 95201E+00 96954E+00 97298E+00
Cp J/(mol•K)	84 2 9 8 8 4 2 9 9 8 8 5 2 2 9 8 8 5 2 2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	81.15 80.83 80.83 81.66 82.80 84.14 84.14 84.14 87.20 99.29 99.29 99.38 102.94 104.71 106.46 108.21 113.35 113.35 114
Cv J/(mol•K)	61.67 61.46 61.46 60.79 60.53 60.53 60.53 60.80 61.41 61.84 62.37 62.37 62.99 62.99 62.71 62.71 62.71 62.71	65.76 66.53 67.84 69.39 71.08 72.85 74.67 76.53 78.51 86.01 87.90 89.78 97.16 97.16 97.16 10.99 117.39 123.44
Entropy J/(mol•K)	82.568 87.019 96.145 104.343 111.811 125.105 136.824 147.405 157.179 157.179 161.827 166.344 170.747 170.747 171.827 181.827 181.827 181.827 181.827	248.887 251.412 254.145 255.808 259.418 261.986 264.519 267.024 271.961
Enthalpy J/mol	222222222222222222222222222222222222222	34466.7 35187.8 35994.1 36806.2 37628.2 39462.8 39311.6 41055.0 41955.0 44748.3 44748.3 44715.4 46700.3 44715.4 46700.3 52981.6 52981.6 52981.6 55214.5 56806.4 66996.4
internal Energy J/mol	386.9 1248.2 2107.4 286.9 2107.2 2966.4 4692.1 5563.5 110090.8 110090.8 110090.8 110090.8 110090.8 110090.8 110090.8 110090.8 110090.8	32435.3 33056.9 33756.7 34466.0 35188.0 35924.7 36677.3 38233.2 40700.5 44245.5 44245.7 4517.6 45127.6 45127.6 46127.6
	2.90580 2.90580 2.67640 2.47049 2.28306 2.11056 1.95040 1.95996 1.52717 1.65996 1.06090 1.0609	03910 04205 04205 04789 05315 05315 05315 05315 06729 06729 06729 06729 06928 07388 0828 0828 08447 08655 10685 11481
lsochore Derivative MPa/K	3.106412 2.980259 2.726417 2.504333 2.307542 2.131327 1.827236 1.624471 1.572118 1.458770 1.254639 1.162060 1.074826 1.07482 1.074826 1.07	.002870 .002665 .002487 .002343 .002117 .002025 .001943 .001684 .001583 .001583 .001583 .001417 .001417 .001417 .001382 .001382 .001382 .001382 .001383
7	.05073 .04851 .04428 .04083 .03797 .03556 .03176 .02803 .02774 .02582 .02582 .02582 .02582 .02582 .02582 .02582 .02582	86925 88375 89698 90792 91714 92503 93781 94769 95551 96455 96455 96455 96455 96455 96455 96455 96456 97937 97937 98389 98389 98994
i ty kg/m³	7.3348E+03 7.2888E+03 7.0850E+03 6.9838E+03 6.9838E+03 6.6805E+03 6.67818E+03 6.67818E+03 6.67818E+03 6.6781E+03 6.6781E+03 6.578E+0	13025E+02 11826E+02 11306E+02 11306E+02 10843E+02 10044E+02 995949E+01 99752E+01 87981E+01 87981E+01 87981E+01 87595E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 87659E+01 8769E+01 8769E+01 8769E+01 8769E+01 8769E+01 8769E+01 8769E+01 8769E+01
Density mol/L	222222222222222222222222222222222222222	2954E+00 2682E+00 2564E+00 2254E+00 2278E+00 2278E+00 2219E+00 2126E+00 1995E+00 1995E+00 195E+00 1735E+00 1735E+00 1651E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1775E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00 1675E+00
Temp.	525 525 525 525 525 525 525 525	281,069 290,000 300,000 310,000 350,000 350,000 350,000 350,000 410,000 410,000 450,000 450,000 450,000 450,000 450,000 450,000 620,000 620,000 660,000

	Dielectric Constant	2.09064 2.08061 2.05879 2.03771 2.01724	1.99725	1.95924	1.90143	1.86258	1.82539	1.80586	1.74454	1.52274 1.69993 1.68434	1.01661	1.01542	1.01469	1.01346	1.01294	1.01203	1.01126	1.01091	1.01029	1.01000	1.00949	1.00925	000000	0.0000	0.0000	0.00000	0.00000	00000000
	Vel. of Sound m/s	2028 1996 1927 1862 1799	1737	1559	1442	1325	1207	1087	964	901 837 793	218	227	233	244	250 254	259	268	272	280	284	292	295	303	306	313	336	350	361
	Fugacity/ Pressure Ratio	.26294E-09 .14648E-08 .37820E-07 .51696E-06	.26111E-04 .11688E-03	.12520E-02	.74143E-02	.15362E-01 .29243E-01	.51/98E-01 .86252E-01	.15615E+00 .20516E+00	.41435E+00	.56037E+00 .73681E+00 .86916E+00	.86916E+00 .87390E+00	.88577E+00	.89600E+00	.91277E+00	.91971E+00 .92590E+00	.93144E+00	.94093E+00	.94501E+00	.946/2E+00	95521E+00	.96066E+00	.96306E+00	.96526E+00	.96922E+00	.97263E+00	2	.98578E+00	.98842E+00 .99054E+00
	Cp J/(mol•K)	84.08 84.29 84.78 85.32 85.92	86.57					100.77	105.78	108.84 112.38 115.05	83.99	82.84	83.17	85.13	86.45	89.47	92.76	94.47	97.94	99.69	103.20	104 . 94	106.68	110.13	113.51	126.35	132,29	143.23
	Cv J/(mol•K)	61.67 61.46 61.08 60.80 60.62	60.53	60.65 60.80	61.41	61.84 62.37	63.71	65.47	67.71	69.03 70.49 71.53	67.31	68.47	69.85	73.12	74.89	78.57	80.44	84.21	87.98	89.85	93.56	95.39	00°66	100.78	104.28	117.41	123,45	134.53
Ø	Entropy J/(mol•K)	82.569 87.010 96.136 104.334	118.686	136.804	147.394	157.166	166.330	175.036	וראת	187.492 191.539 194.171	248.675	252.493	255.213	260,467	263.028	268.053	272.977	275.409	280.219	282.600	287.319	289.658	291.985	296.596	301.161	318.952	327.576	336.023 344.295
P = 0.7 MPa	Enthalpy J/mol	42.7 428.5 1290.3 2150.0 3009.5	3870.8 4736.3	5608.2 6488.9 7380.4	8284.7	9203.5	12062.0	14065.1	16158.0	17242.5 18356.2 19102.4	34720.0	35839.9	36669.4	38350.4	39208.1 40079.9	40966.7	41869.4	43724.7	445/8.0	46636.9	48665.8	49706.5	50/64.6	52932.7	55169.2	64771.8	69945.7	75351.0 80975.1
	Internal Energy J/mol	386.2 1247.3 2106.4 2965.3	3826.0 4690.8	5562.0 6442.0 7332	8236.2	9154.2	12010-1	14011.1	16101.5	17184.6 18296.7 19041.9	32684 . 8	33650.6	34372.3	35847.8	36606.5	38171.9	39805.7	40649.2	42390.1	43287.6	45136.8	46088.3	4/05/.6	49049.1	51110.1	± 00	64849.2	69912.7 75196.3
Propane Isobar at	Isotherm Derivative MPa·m3/kg	3.01874 2.90692 2.67754 2.47166 2.28425	2.11177	1.80194 1.66126 1.52850	1.40282	1.28356	1.0625 .95969	.76881	.59588	.51570 .43947 .39167	.03825	.04287	.04594	.05156	.05418	.05919	.06397	06629	.07082	.07305	.07743	.07958	.081/5	.08596	.09015	.10651	.11454	.12249
	lsochore Derivative MPa/K	3.106436 2.980575 2.726772 2.504720	2.131765	1.694973	1.459315	1.255835	1.075479	.995009 .914729	.768821	.700305 .634160 .591965	.003298	.003042	.002844		.002425		.002066	.001996	.001871	.001816	.001716	.001670	.00162/	.001549	.001478	.001253	.001166	.001090
	Z	.05917 .05659 .05166 .04763	.03910	03527	.03236	.03012	.02820	.02708	.02613	.02578 .02553 .02542	.85426	.87767	.89121	.91207	.92030	•93369	.94410	.94847	.95591	.95910	.96463	.96703	.96925	.97311	.97640	.98561	.98865	.99102 .99290
	sity kg/m3	.73350E+03 .72892E+03 .71870E+03 .70854E+03	.68833E+03 .67823E+03	.66810E+03 .65793E+03	.63735E+03	.62687E+03 .61624E+03	.60541E+05 .59434E+03	.58298E+05 .57127E+03	.54654E+03	.53331E+03 .51932E+03 .50967E+03	.15167E+02 .14869E+02	.14100E+02	.13438E+02	.12335E+02	.11865E+02 .11437E+02	•11045E+02	.10548E+02	.10037E+02	.9/454E+UI .94727E+01	.92164E+01	.87470E+01	.85314E+01	.852/0E+01 .81329E+01	.79482E+01	.76045E+01	.64944E+01	.60568E+01	.53416E+01
	Density mol/L	.1663E+02 .1653E+02 .1630E+02 .1607E+02	.1561E+02 .1538E+02	.1515E+02 .1492E+02	.1445E+02	.1422E+02 .1397E+02	.1375E+02 .1348E+02	.1522E+02 .1295E+02	.1239E+02	.1209E+02 .1178E+02 .1156E+02	.3439E+00	.3197E+00	.3047E+00	.2797E+00	.2691E+00 .2594E+00	.2505E+00	.2425E+00 .2347E+00	.2276E+00	.22148E+00	.2090E+00	.1984E+00	.1935E+00	.1888E+00 .1844E+00	.1802E+00	.1724E+00	.1473E+00	.1374E+00	•1287E+00 •1211E+00
	Temp.	85,535 90,000 100,000 110,000	130.000	160.000	180.000	190.000	220.000	230.000	260.000	270.000 280.000 286.539	286.539	300.000	310.000	330,000	340.000	360.000	380.000	390.000	400.000	420.000	440.000	450.000	460.000	480.000	500.000	580.000	620.000	700.000

Table 21. (Continued) Propane Isobar at P = 0.8 MPa

(pa	MPa
Tinu	00
Cont	11
\subseteq	0_
•	at
rable 21	Isobar
_	Propane

	Dielectric Constant	2.09074	2.05897	2.03791	2.01745	1,97789	1.95860	1.93954	1,92062	1,90178	1.88296	1.86408	1.84508	1.82589	1.80642	1.0021	1 74534	1,72365	1.70100	1.67709	1.65150	1,65128	1.02388	1.02243	1.02122	1.02019	1 01879	1.01777	1.01712	1.01653	1.01598	1.01500	1.01157	1,01416	1.01377	1.01341	0.00000	0.00000	0.0000	0.0000.0	0.00000	0.00000	0.00000	
Vel. of	Sound m/s	2029	1928	1863	1800	1678	1619	1560	1502	1444	1385	1327	1268	1209	1150	1000	670	90.5	841	775	200	705	214	222	229	236	747	253	258	265	267	276	280	284	288	292	296	500	7004	1 CX	337	349	361	1
Fugaci ty/	Pressure Ratio	.19093E-09	.27067E-07	.36933E-06	.31402E-05	83195F-04	29762F-03	.88978E-03	.22983E-02	.52625E-02	.10898E-01	.20736E-01	.36715E-01	•61116E-01	.96445E-01	010185-00	20331E±00	39662F+00	.52144E+00	.66845E+00	.83759E+00	.83903E+00	.83903E+00	.85425E+00	.86729E+00	.87864E+00	*8886ZE+UU	.90537E+00	.91243E+00	.91880E+00	• 92455E+00	93452E+00	.93885E+00	.94282E+00	.94647E+00	.94982E+00	.95289E+00	.955/5E+00		970815+00	1 1 1 1	111	984855+00	1
. •	Cp J/(mol*K)	84.08	84.78	85.32	85.91	87.78	88.08	88.97	89,95	-	92.26	93.60	95.09	96.76	98.61	100,000	105.01	108.66	112.14	116.27	121.31	121,36	92.45	89.63	88.77	88 8	04°40	91.58	92.91	94.35	95.86	99.05	100.70	102.36	104.03	105.71	107.38		110.73	0 4	9.	5	138,15	ĵ
(Cv J/(mol•K)	61.69	61.09	60.81	60.63	60,55	60-64	60.81	61.08	61.42	61.86	62.38	63.00	63.73	64.55	, t = 00	67 72	69.04	70,50	72.12	73.91	73.93	71.39	71.71	72.76	74.13	0°C/	79, 10	80.89	82.70	84.54	88.23	90.07	91.91	93.73	95.55	97.35	99,13	100.90	111,00	117.47	123.50	129.19	•
, (o	Entropy J/(mol•K)	82.572	96.110	104.307	111.774		131.083	136.773	142,185	147,360	152,332	157,129	161.774	166.288	170.687	170 000	183.346	187,479	191.468	195,482	6	6	248.207	-	253,985	256.716	770.627	264 - 546	267.073		272.040	276.912	279,319	281.708	284.080	286,437	288.778	291.106	200 000	307.030	315,860	324.504	332.966	7
	Enthalpy J/mol	60.9	1306.1	2165.7	3025.1	4751-7	5623.5	6504.0	7395.3	8299.3	9217.9	10152.4	11104.4	12075.1	13065.5	1511000	16167.4	17250.3	18361.9	19506.4	20690.3	20700.7	35308.0	36208.3	37099.2	37986.7	268//09	40686.8	41609.2	42545.4	43496.4	45445.3	46444.0	47459.2	48491.2	å		51687.4	55024	50705 A	64669.7	69855.5	75270.7	
80 -	Energy J/mol	802	1244.7	2103.5	2962.0	4686.7	5557.6	6437.0	7327.2	8230.2	9147.5	10080.9	11031.6	12000.9	12989.9	15021	16086.8	17167.7	18277.1	19419.1	20600.1	20610.5	33280.6	34052.5	34823.4	35597.0	202/8.8	37978.6	38799.9	39636.9	40490.3	42247.5	43151.9	44073.7	45012.9	45969.5	46943.4	47954.7	51011 2	55347.2		64778,1	69847.7	0
	Derivative MPa.m3/kg	3.02137	2.68097	2,47515	2.28781	1.95535	1,80574	1,66515	1.53248	1.40690	1.28775	1.17451	1.06678	.96423	.86658	41702 60515	.00710	52102	.44501	.37279	.30412	.30356	.03544	.03956	.04320	.04653	.04965 05257	05538	.05808	0.06070	.06325	06817	.07056	.07291	.07523	.07752	.07978	.08201	08860	00000	.10552	.11375	.12188	
Isochore	Derivative MPa/K	3,106511	2.727840	2,505883	2.309200	1.973976	1.829158	1 .696476	1.574206	1.460946	1.355537	1.257009	1.164543	1.077433	.995067	0000160	771305	702987	.637088	.573143	.510596	.510077	.005165	.004658	.004290	.004003	10/5/00	002200	.003247	.003114	•002994	.002286	.002695	.002611	.002533	.002461	.002393	.002529	.002209	001972	.001817	.001687	.001575	
1	7	.08450	.07378	•06804	.06327	05584	05201	.05037	.04815	.04621	.04451	.04301	.04170	.04054	.03953	00000	02720	03679	.03643	.03620	.03614	.03614	.81256	.83636	.85537	.87095	.884UZ	90478	.91317	.92053	92706	93806	.94273	.94695	.95078	.95425	.95743	.96033	96796	97514	69086	.98494	98824	
-	ity kg/m3	. 73357E+03	.71881E+03	.70866E+03	.69856E+03	678385+03	.66827F+03	.65811E+03	.64789E+03	.63756E+03	.62711E+03	.61650E+03	.60569E+03	.59465E+03	•58332E+03	- 1 100E+02	54704E+03	53389F+03	.52000E+03	.50518E+03	.48913E+03	.48899E+03	.21751E+02	.20456E+02	• 19376E+02	• 18453E+02	. 1/643E+UZ	. 16283E+02	.15697E+02	.15162E+02	.14669E+02	13790E+02	.13395E+02	.13025E+02	.12678E+02	.12351E+02	.12042E+02	.11/51E+02	109615402	10072F+02	.93242E+01	.86851E+01	.81315E+01 .76467F+01	
	Density mol/L	.1664E+02	.1630E+02	.1607E+02	•1584E+02	15385+02	1515F+02	. 1492E+02	.1469E+02	.1446E+02	.1422E+02	•1398E+02	.1374E+02	.1348E+02	.1323E+02	12505102	1209E+UZ	1211F+02	.1179E+02	.1146E+02	.1109E+02	.1109E+02	.4932E+00	.4639E+00	.4394E+00	.4185E+00	.4001E+00	. 3692E+00	.3560E+00	.3438E+00	.3327E+00	.3127E+00	.3038E+00	.2954E+00	.2875E+00	.2801E+00	.2731E+00	.2665E+00	2/8/5/100	. 2284F+00	.2114E+00	.1970E+00	.1844E+00	· · · · · · · · · · · · · · · · · · ·
	Temp. ×	85,563	100,000	110.000	120.000	140,000	150.000	160,000	170,000	180,000	190.000	200.000	210,000	220,000	230.000	250 000	250.000	270.000	280,000	290.000	300,000	300.084	300.084	310,000	320,000	330.000	240.000	360,000	370,000	380.000	390,000	410,000	420.000	430.000	440.000	450.000	460.000	4 /0.000	500.000	540.000	580,000	620,000	700-000	

Table 21. (Continued) Propane Isobar at P = 1.2 MPa

ielectric Constant	2.09081 2.08089 2.05910 2.03804 2.01760	1.97806 1.95878 1.92083 1.90201 1.88521 1.86436 1.84539	1.80679 1.78699 1.74586 1.72456 1.70170 1.67792	1.02893 1.02841 1.02661 1.02514 1.02389 1.02281 1.02281 1.01286 1.01951 1.01826 1.01626 0.00000 0.000000 0.000000	0.0000000000000000000000000000000000000
Vel. of Sound D m/s		1679 1620 1561 1503 1445 1387 1270 1270	1152 1092 1031 908 844 778 710		360
Fugacity/ Pressure Ratio	16304E-09 88973E-09 22891E-07 31199E-06 26501E-05	.25065E-03 .25065E-03 .74899E-03 .19338E-02 .44261E-02 .91626E-02 .17429E-01 .30852E-01	81008E-01 .12201E+00 .17646E+00 .24625E+00 .33295E+00 .43771E+00 .56109E+00	82157E+00 84219E+00 84219E+00 85601E+00 86809E+00 887877E+00 89671E+00 91740E+00 91740E+00 91740E+00 92324E+00 93294E+00 93727E+00 93727E+00 94827E+00 94827E+00 94827E+00 94827E+00 94827E+00 94827E+00	98260E+00
Cp J/(mol•K)	44.08 4.28 7.77 5.31 5.90	887.27 888.07 888.96 89.94 91.03 92.24 93.57		727 4 72 6 72 72 72 72 72 72 72 72 72 72 72 72 72	138.30 • 143.56 •
Cv J/(moi•K)	61.69 60.149 60.82 60.64	60.56 60.65 60.82 61.08 61.43 61.87 62.39 63.01	64.56 65.50 66.55 67.73 69.04 70.50 72.12 73.91	73.80 73.66 73.99 75.00 76.35 77.88 79.52 86.59 86.59 86.59 90.23 92.05 92.05 92.05 92.05 91.45 100.98	129.22
Entropy J/(mol•K)	82.574 86.968 96.092 104.289 111.756	125.047 131.063 136.752 142.163 147.338 157.104 161.748	170.658 174.956 174.956 183.308 187.387 191.422 195.429 199.432	247.959 248.739 251.750 254.603 257.351 260.024 265.209 267.241 270.241 270.241 270.241 270.241 272.913 282.377 282.377 282.377 282.377 289.438 291.760 289.438 291.4760	331.389 339.682
Enthalpy J/mol	73.1 454.9 1316.6 2176.2 3035.6 3895.8	4762.0 5633.7 6514.1 7405.2 8309.1 9227.4 10161.8 11113.5	13073.7 14084.5 16117.3 17255.6 18365.8 19508.5 20689.8	35601.2 35842.6 36790.8 37717.7 38638.3 39560.5 40489.0 42376.3 443338.7 44315.1 44315.1 44315.2 46312.7 46312.7 50494.2 55648.2 55648.2 64602.5	75218.2 80856.3
Internal Energy J/mol		4684.0 5554.6 6433.7 7323.6 8226.1 9143.1 10076.0 11026.2	12983.1 13992.0 15022.8 16077.0 17156.5 18264.2 19403.9 20581.8	35589.6 33795.1 34607.6 55409.5 36212.0 37021.3 37021.3 38672.8 40379.8 41256.5 42149.4 43058.9 43058.9 44928.6 44928.6 4488.9 47860.5	69804.8 75096.9
	3.02312 2.91255 2.68326 2.47748 2.29019	1,95783 1,80827 1,80877 1,53513 1,29052 1,29054 1,17737 1,06972	.86968 .77682 .68845 .60441 .524868 .37664 .30817	.03345 .03468 .03908 .04643 .04643 .04643 .05275 .05848 .06383 .06383 .06383 .06383 .07378 .07378 .07850 .07850 .07850 .07850 .07850 .07850 .07850 .07850 .07850 .07850	.12963
sochore Derivative MPa/K	3.106562 2.982158 2.728552 2.506658 2.310028	1.974895 1.830118 1.697477 1.462033 1.35669 1.258192 1.165780	.996436 .918355 .844009 .772952 .704764 .639024 .575281	.006463 .006258 .005621 .005621 .004808 .004817 .004873 .004873 .005771 .005320 .005320 .005320 .005320 .005320 .005320 .005310 .002928 .002928 .002928	.001903
2	.09699 .08853 .08163 .07591	.06700 .06348 .06043 .05777 .05545 .05340 .05160 .05002	.04742 .04537 .04472 .04412 .04367 .04340	.78672 .79439 .82056 .84127 .85827 .87254 .89472 .91966 .92604 .93691 .94156 .94156 .94577 .94156 .94577 .94577 .94577	.98649
ity kg/m3	.73362E+03 .72909E+03 .71889E+03 .70874E+03 .68864E+03	.67848E+03 .66838E+03 .65823E+03 .64802E+03 .62770E+03 .61667E+03 .60588E+03	.58356E+03 .57192E+03 .55989E+03 .54737E+03 .53427E+03 .52045E+03 .50571E+03 .48979E+03	26306E+02 25844E+02 24238E+02 22925E+02 20840E+02 19982E+02 19982E+02 17884E+02 1780E+02 1780E+02 1780E+02 1750E+02 16763E+02 17763E+02 1776	.97751E+01 .91879E+01
Density mol/L	. 1664E+02 . 1655E+02 . 1650E+02 . 1607E+02 . 1584E+02	1539E+02 1516E+02 1493E+02 1470E+02 1426E+02 152E+02 1539E+02 1574E+02	1323E+02 1297E+02 1270E+02 1241E+02 1212E+02 1180E+02 1147E+02		.2217E+00 .2084E+00
Temp. K			230,000 250,000 250,000 250,000 270,000 280,000 300,000 307,524		700.000

	Dielectric Constant	2.09087 2.08100 2.05922 2.03818 2.01774	1.97823	1.93993 1.92104	1.90224 1.88346 1.86463	1.82556	1.80716	1.76718	1.72486	1.67875	1.65351	1.01401	1.03266	1.02885	1.02615	1.02406	1,02317	1,02162	1.02094	1.01971	0.00000	0.00000	0.00000	0.000000	0.00000	0.000000
	Vel. of Sound m/s	2030 1998 1930 1864 1861	1740	1562	1446 1388 1330	1271	1153	1033	910	781	714 642	719	207	230	244	255	261	271	275	284	292	300	308	322	348	360
	Fugacity/ Pressure Ratio	.14320E-09 .77506E-09 .19912E-07 .27109E-06	.13609E-04 .60767E-04	.64849E-03	.38290E-02 .79239E-02	.26666E-01	.69987E-01	.15240E+00	.28750E+00	.48442E+00	.60698E+00 .74492E+00	•805/IE+00	.80571E+00 .81690E+00	84762E+00	.87126E+00	.89000E+00	.89799E+00	.91178E+00	.91776E+00	.92823E+00	.93704E+00	.94095E+00	.95101E+00	.96146E+00	.97560E+00	.980475400 .98436E+00
	Cp J/(mol•K)	84.08 84.28 84.77 85.31	86.55	88.95 89.92	21		98.52	102.87	108.42	115.85	126.87	16.671	104.46	95.26	95.26	96.94	98,10	100.77	102.22	105.26	108.41	110.00	114.78	121.06	152,93	158.45
	Cv J/(mol•K)	61.70 61.50 61.11 60.83	60.56	60.83 61.09	61.44 61.87 62.40	63.02	64.57	66.56	69.05	72.12	75.91	0.18	76.06	77.13	79.99	83.31	85.05	88.61	90.40	93.99	97.56	99.32	104.52	117.55	50	129.24
ō	Entropy J/(mol•K)	82.576 86.951 96.075 104.272 111.738	118,620	136.731	147.315 152.285 157.079	161.722	170.628	179.134	187.346	195.376	203.393	C00°C07	247.730 249.626 252.647	255.508	260.940	266.131	268,664	273.634	276.080	280.905	285.653	288.001	294.954	304.027	321.564	338.348
P = 1.4 MPa	Enthalpy J/mol	85.3 465.5 1327.2 2186.7 3046.0	3907.1	6524.2 7415.2	8318.9 9237.0 10171.1	11122.6	13082.0	15124.5	17260.9	19510.7	20689.6		35838.6 36440.2 37421.6	38379.9	40281.0	42201.2	43176.2	45164.2	46179.1		50390.2	52590.2	54853.9	59571.2	69737.8	75166.4 80810.2
4	Internal Energy J/mol	380.8 1241.3 2099.6 2957.7	3817.5	6430.4 7319.9	8222.1 9138.6 10071.0	11020.7	12976.3	15014.3	17145.4	19388.8	20563.7	8°50577	33848.6 34359.7 35201.2	36030.8	37695.0	39395.7	40265.3	2048	42965.9	44842.9	46788.0	47785.7	50878.2	55230.7	64684.4	69762.2 75057.9
Propane Isobar	lsotherm Derivative MPa·m3/kg	3.02488 2.91480 2.68555 2.47981 2.29256	2.12025	1.67033	1.41234 1.29332 1.18023	1.07265	.87279	.69174	.52807	.38046	.31220	07177	.03452	.04568	.05004	.05623	.05912	.06461	.06724	.07233	.07722	.08197	.08659	.10427	.11278	.12936
	lsochore Derivative MPa/K	3.106614 2.982791 2.729264 2.507433 2.310856	2.134829	1.698477	1.463117 1.357800 1.259372	1.167015	.997800	.845542	.706531	.577402	.515383		.007872	.005996	.005238	.004705	.004491	.004131	,003837	.003710	.003483	.005582	.003117	.002829	.002402	.002236
	7	.11823 .11315 .10328 .09523	.08294	.07049	.06467	.05834	.05530	.05302	.05144	.05058	.05047	02020	.76196 .78197 .80926	.83098	.86392	.88795	.89769	.91391	.92071	.93232	.94183	.94595	.95633	.96674	.98029	.98480 .98835
	:1+y kg/m3	.73367E+03 .72916E+03 .71896E+03 .70882E+03 .69873E+03	.68866E+03 .67859E+03	.65835E+03 .64815E+03	.63784E+03 .62742E+03 .61684E+03	.60606E+03	.58378E+03	.56018E+03	.53465E+03	.50624E+03	.49043E+03 .47305E+03	•40251E+U5	.31024E+02 .29673E+02 .27803F+02	.26280E+02	.23874E+02	.22006E+02	.21209E+02	.19816E+02	. 19201E+02 . 18631E+02	.18100E+02	171396+02	.16/01E+02 .16288E+02	.15528E+02	.14223E+02 .13138E+02	•12217E+02	.11424E+02 .10732E+02
	Density mol/L	.1664E+02 .1654E+02 .1630E+02 .1607E+02	.1562E+02 .1539E+02	.1493E+02 .1470E+02	.1446E+02 .1423E+02 .1399F+02	.1374E+02	.1324E+02	.1270E+02	.1212E+02	.1181E+U2 .1148E+O2	.1112E+02 .1073E+02	• 1035E+UZ	.7035E+00 .6729E+00 .6305E+00	.5960E+00	. 5414E+00	.4990E+00	.4809E+00	.4494E+00	.4354E+00 .4225E+00	.4105E+00	. 3887E+00	.5/8/E+00 .3694E+00	•3521E+00	.3225E+00 .2979E+00	.2770E+00	.2591F+00 .2434E+00
	Temp.	85.600 90.000 100.000 110.000	130.000	160.000	180.000 190.000	210.000	230.000	250.000	270.000	290.000	300.000	214.107	314.107 320.000 330.000	340.000	360,000	380,000	390.000	410.000	420.000	440.000	460.000	4 /0.000	500.000	540.000	620,000	700°000

Table 21. (Continued) Propane Isobar at P = 1.6 MPa

Dielectric Constant	2.09094 2.08112 2.05934 2.03831 2.01788 1.95915 1.95915 1.95915 1.95915 1.96491 1.86491 1.86491 1.86491 1.76764 1.76764 1.76764	1.65450 1.62734 1.59712 1.59701	1.025660 1.03425 1.03425 1.03233 1.02598 1.02598 1.02598 1.02598 1.02598 1.02513 1.02213 1.02213 0.00000 0.00000 0.00000
Vel. of Sound m/s	2030 1999 1950 1865 1865 1622 1563 1563 1273 1273 1273 1273 1273 1273 1273 127	5717 571 571 571	222 232 232 233 245 263 263 263 263 263 263 263 263 263 273 284 295 291 335 335 335 335
Fugacity/ Pressure Ratio	.12840E-09 .68922E-09 .17682E-07 .24045E-06 .20385E-04 .53768E-04 .53768E-04 .53768E-04 .53768E-04 .53768E-04 .53768E-01	.53495E+00 .65654E+00 .79060E+00 .79111E+00	81038E+00 82716E+00 8438E+00 8438E+00 88573E+00 88573E+00 89320E+00 90067E+00 90746E+00 91357E+00 92935F+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 92935E+00 9377E+00 92935E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00 9377E+00
Cp J/(mol•K)	84.08 84.08 85.30 85.30 86.54 88.05 88.05 88.05 90.99 90.99 90.09 90	120.42 126.43 134.57 111.17	102.79 99.37 97.96 97.96 97.96 99.39 100.50 101.73 108.96 112.05 112.05 112.05 115.17 121.35 127.36 133.12
Cv J/(mol•K)	61.71 61.72 60.84 60.66 60.58 60.57 60.58 60.84 61.10 61.10 61.88 62.75 63.03 63.03 63.03 63.03	75.91 78.89 78.10 78.11	74.50 78.08 79.17 80.53 80.53 82.66 85.34 87.07 88.82 90.59 90.59 97.42 101.16 117.59 123.59 123.59
Entropy J/(mol•K)	82.578 86.934 96.058 104.254 111.720 118.601 125.008 131.023 136.711 147.293 157.055 157.055 157.055 170.599 174.893 170.599 170.599 170.599 170.599 170.599 170.599	199.311 203.321 207.401 207.415 247.505	250, 762 255, 773 256, 630 259, 383 264, 675 267, 245 272, 271 274, 739 274, 739 277, 181 279, 599 284, 374 286, 734 286, 734 286
Enthalpy J/mol	97.5 1337.7 2197.2 3056.4 3917.5 4782.6 6554.1 6554.1 8328.7 9246.6 10180.5 11131.6 12101.2 13090.4 17266.3	20689.5 21912.1 23196.3 23200.8 36031.0	27.090.2 38098.7 38098.7 40061.3 41058.0 42019.3 42019.3 45018.9 45018.9 45018.9 45018.9 45018.9 5281.3 5281.3 52491.3 52491.3 54763.6 69679.7
Internal Energy J/mol	1.3 1239.5 1239.5 2097.7 2955.5 3815.1 4678.7 4678.7 10066.1 11015.2 11982.7 11982.7 11982.7 11982.7 11982.7 11982.7 11983.6 15005.7	20545.8 21763.2 23041.0 25045.5 34067.2	54965.9 35686.4 37540.2 38359.2 40146.6 41038.9 41038.9 44755.7 44755.7 44755.7 44759.9 48727.3 59784.8 64637.8
sotherm Derivative MPa.m3/kg	3.02664 2.91705 2.68784 2.28214 2.29493 2.12267 1.96277 1.81333 1.67292 1.67292 1.67292 1.67292 1.67292 1.67292 1.67292 1.6758	.25152 .18981 .18960 .02933	0.0448 0.04725 0.04725 0.05093 0.05997 0.05982 0.06826 0.06826 0.06826 0.07088 0.07088 0.07596
sochore Derivative MPa/K	3.106667 2.983425 2.729976 2.508208 2.311684 1.976731 1.677332 1.68248 1.081321 1.08	. 517740 . 456919 . 396059 . 395845	.0081/6 .007371 .006307 .005922 .005932 .005937 .004862 .004862 .004862 .004862 .004966 .004938 .004996 .0039373 .003973 .002997 .002997
7	.15508 .12930 .11802 .1082 .10119 .09477 .08054 .07700 .07700 .07389 .07117 .06675 .06677 .06677 .06677 .06777 .0656	.05760 .05777 .05835 .05836	. 17421 . 80181 . 82395 . 84228 . 85776 . 87105 . 88259 . 90164 . 90164 . 90168 . 92307 . 92883 . 93405 . 93880 . 94314 . 96264 . 97805 . 97805
sity kg/m3	73371E+03 7292ZE+03 70890E+03 6988ZE+03 6988ZE+03 68875E+03 66860E+03 65860E+03 65860E+03 65379E+03 61700E+03 60625E+03 60625E+03 59527E+03 59527E+03 59527E+03 59527E+03 59527E+03 59527E+03 59527E+03 59527E+03 59527E+03	.49107E+03 .47385E+03 .45444E+03 .45437E+03	25.2146+02 231276+02 2294266+02 279866+02 267386+02 256376+02 2265376+02 229556+02 229556+02 22956602 215286+02 208036+02 208036+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197506+02 197706+02
Density mol/L	1664E+02 1654E+02 1631E+02 1608E+02 1585E+02 1562E+02 1562E+02 1576E+02 1476E+02 1476E+02 1476E+02 1476E+02 1476E+02 1476E+02 1506E+02 1506E+02 1516E+02 1756E+	.1114E+02 .1075E+02 .1031E+02 .1030E+02	7052E+00 6673E+00 6673E+00 6673E+00 6063E+00 5781E+00 5789E+00 5789E+00 473E
Temp.	85.618 90.000 100.000 120.000 120.000 150.000 170.000 170.000 170.000 180.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000	300.000 310.000 320.000 320.035	550,000 340,000 340,000 350,000 370,000 390,000 410,000 420,000 440,000 440,000 450,000 460,000 560,000 560,000 660,000 660,000

	Dielectric Constant	2.09101 2.08123 2.05946	2.01803	1.97856	1.94032	1.92147	1.88397	84	1.80789	1.78822	1.74743	1.72605	1.70378	1.65548	1.62855	1.58066	1.04540	1.04020	1.03766	1.03382	1.03229	1.03095	1.02866	1.02767	1.02593	-005515	000000		0.0000	0.0000	000000	0.0000	
	Vel. of Sound m/s	2031 1999 1931 1866	1803	1682	1564	1506	1390	1274	1157	1098	977	915	852	721	651	533	200	217	226	241	248	254	265	270	280	284	289	797	305	320	347	371	
	Fugacity/ Pressure Ratio	.11695E-09 .62263E-09 .15951E-07	.18351E-05	8331	.1/249E-03	.13270E-02		.21089E-01	1 1 1 1	.83249E-01	• 12034E+00 • 16788E+00	.22692E+00	.29824E+00	.47894E+00	£ 6	1111	•77757E+00	.80663E+00	.82315E+00	.85041E+00	.86182E+00	.87206E+00	.88968E+00	.89729E+00	.90422E+00	.91642E+00	.92176E+00	.93127E+00	.93941E+00	.95256E+00	7 0	.97639E+00	777
	Cp J/(mol•K)	84.07 84.27 84.76	85.88	87.25	88.92	89.90	92.17		98.42	100.45	105.29	108.20	111.54	120.14	126.01	139.61	118.60	104.83	101.70	66.66	100.22	100.84	102.78	103.98	106.65	108.07	109.53	112.53	110	121.65	- M	138.76	`
	Cv J/(moi•K)	61.72	60.58	60.58	60.85	61.11	61.89	63.04	64.58	65.52	67.75	90*69	70.52	73.92	75.89	79.40	80.28	79.24	79.98	82,52	84.04	85.66	89.05	90.78	94.29	96.04	97.79	30	104.68	111.31	123.63	129.30	o 1-
a	Entropy J/(mol•K)	82.581 86.917 96.040	111.701	9 9	136.690	142,099	152.238	161,670	170.569	174.861	183,196	187.264	191.284	199.252	203,250	209.575	247.272	252.091	255.078	260.664	263,333	265,943	271.032	273.523	278.420	280.833	283.224	287.949	292.604	301.730	319.333	200	
P = 1.8 MPa	Enthalpy J/moi	109.7 486.6 1348.2 2207.7	3927.9	4792.9	6544.4	7435.1	9256.2	11140.7	13098.7	14107.9	15156.8 16192.8	17271.7	18378.0	20689.5	21908.7	23917.3	36185.5	37788.6	38819.2	40829.5	41830.2	42835.3	44870.2	45904.0	48009.8	49083.4	50171.4	52391.9	54672.9	59417.6	69622.0	75064.3	100
+6	Internal Energy J/mol	1.5 377.8 1237.8 2095.7	2953.3	4676.0	6423.8	7312.7	9129.8	11009.8	12962.8	13969.3	16048.1	17123.4	18225.9	10	21741.5	3738	34251.8	35611.1	36498.2	38251.4	39133.0	40023.4	41839.0	42766.9	44666.9	45639.9	46628.6	48654.0	50743.5	55113.7		69677.7	10001
Propane Isobar	Isotherm Derivative MPa·m3/kg	3.02840 2.91930 2.69012 2.48446	2,29730	1.96525	1.67550	1.54308	1.29889	1.07851	.87897	.78638	.61459	.53508	.45963	.32019	.25575	.16202	.02722 02020	.03565	.04025	.04810	.05159	05488	.06101	.06391	.06944	.07210	.07470	.07975	.08464	.09405	.11186	.12043	0004
	Isochore Derivative MPa/K	3.106721 2.984059 2.730688 2.508983	2.312512	1.977648	1.700475	1.578371	1.261728	1,169479	1.000518	.922671	.777850	.710039	.644758	. 520073	.459589	.365890	.011067	.008991	.008140	.006988	.006568	.006212	.005638	.005400	.004995	.004820	.004660	-004576	.004131	.003728	.003140	.002916	71 77000
	Z	.15193	11383	.10046	09060	.08661	.08004	.07496	.07104	.06946	96990	•06604	.06534	.06472	.06550	.06610	.71459	.77026	.79755 81065	.83806	.85369	.86716 87889	.88921	.89834	.91378	.92035	.92629	.93659	.94518	.95859	.97588	.98159	
	sity kg/m3	.73376E+03 .72929E+03 .71911E+03	.69890E+03	.67879E+03	.65859E+03	.64841E+03 .63813E+03	.62773E+03	.60644E+03	.58424E+03	.57269E+03	.54836E+03	.53540E+03	.52177E+03	.49170E+03	.47464E+03	.44377E+03	.41050E+02	.36453E+02	.34200E+02	.30787E+02	.29428E+02	.28228E+02	.26186E+02	.25302E+02	.23744E+02	.23051E+02	• 22405E+02	.21235E+02	.20201E+02	• 18443E+02 16996F+02	•15778E+02	.14736E+02	1
	Density mol/L	.1664E+02 .1654E+02 .1631E+02	.1585E+02	.1539E+02	.1318E+02	.1470E+02 .1447E+02	.1424E+02	.1375E+02	.1325E+02	• 1299E+02	.1244E+02	.1214E+02	.1183E+02	.1115E+02	.1076E+02	.1006E+02	.9309E+00	.8266E+00	.7756E+00	.6982E+00	•6673E+00	.6401E+00	.5938E+00	.5738E+00	. 5384E+00	.5227E+00	.5081E+00	.4816E+00	.4581E+00	.4182E+00	.3578E+00	.3342E+00	
	Temp.	85.637 90.000 100.000	120.000	140.000	160,000	170.000	190.000	210.000	230,000	240.000	260.000	270.000	280.000	300.000	310,000	325.444	325.444	340.000	350.000	370.000	380.000	390,000	410.000	420.000	440.000	450.000	460.000	480.000	500,000	540.000	620.000	660.000	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

	Dielectric Constant	2.09107	2.05958	2.01817	1.99825	1.97875	1.94052	1.92168	1.90294	1.83422 1.86546	1.84659	1.82755	1.80826	1.76856	1.74794	1,72664	1,70446	1.68118	1.65644	1.60026	5663	1.56476	1.05146	1.04691	1.04349	1.03250	1.03672	1.03508	1.03364	1.05255	1.03012	1.02914	1.02825	0.00000	0.00000	0000000	0.0000	000000	0.000000	0.00000
	Vel。 of Sound m/s	2031	1932	1804	1743	1683	1565	1507	1449	1231	1276	1217	1159	1040 1040	979	918	855	791	725	582	501	498	196	209	219	920	243	250	256	292	273	278	282	287	296	304	319	346	359	370
	Fugacity/ Pressure Ratio		.14569E-07	6726E	.98706E-05	.43986E-04	.46786E-03	.12058E-02	•27556E-02	10827E-01	. 19139E-01	.31821E-01	.50165E-01	109135+00	.15222E+00	.20573E+00	·27037E+00	.34652E+00	.45416E+00	64176E+00	5956	.76493E+00	.76493E+00	.78598E+00	.80464E+00	83516F±00	.84787E+00	.85926E+00	.86951E+00	8/8/9E+00	89491E+00	.90193E+00	90838E+00	.91428E+00	.92477E+00	.93375E+00	.94823E+00	6774	.97443E+00	,97977E+00
	Cp J/(mol•K)	44	84.76	5.88		87.24										108.09	111.40	115.26	175.60	135, 19	144.50	145.13	-	112.48	6.4	103.70	102.20	102.45	103.06	105.92	106.14	107.41	108.75	111.57	113.03	115.99	121.96	133.50	138.92	144.08
	Cv J/(mol·K)	61.73	61.13	60.68	60.59	60,59	60.86	61.12	61.46	61.90	63.05	63.77	64.59	00.00 00.13	67.76	69.07	70.53	72.14	75.92	78,07		80.65	82,31	80.74	80.94	83.04	84.46	86.00	87.62	89.29	92.71	94.44	96.18	97.91	101.36	104.76	111.37	123-66	129.33	134.67
Ø	Entropy J/(mol•K)	82.583	96.023		118,564	124.970	136.669	142.077	147,248	152.215	161.644	166.149	170.540	179.032	183, 159	187,223	191.239	195.222	199, 195	207.226		211,586	247.025	250.406	255.568	250.22	262.074	264.731	267.331	269.886	274.886	277,341	279,769	282 • 175 284 559	286.923	291.597	300.750	318,386	326.902	335.228
= 2.0 MPa	Enthalpy J/mol	- 0	1358.8	0	3938.2	4803.2	6554.4	7445.0	8348.2	10100 2	11149.8	12118.7	13107.0	15146.0	16199.3	17277.2	18382.3	19518.0	20689.8	23179.1	24536.0	24596.5	36306.4	37440.2	38530.9	40610.1	o o	10	3683.	44/1/09	6817	47885.3	48966.0	51168.8	52291.8	54581.8	59340.9	69564.6		80674.9
sobar at F	Internal Energy J/mol	1.7	1236.1	2951.1	3810.2	4673.3	6420.6	7309.0	8210.1	10056.3	11004.4	11970.7	12956.1	14988.8	16038.5	17112.6	18213.4		20510.6	22985.9	2	24393.0	34406.5	35360.9	36292.2	38094.9	38992.3	39895.2	40806.9	41/29.6 12661 B	43613.5	44576.5	45554.3	4024/05	48579.9	50675.4	55055.0	4545	0.0	74942.1
Propane	lsotherm Derivative MPa·m3/kg	3.03015	2,69241	2.29968	2,12751	1.96772	1.67809	1.54573	1.42047	1.18879	1.08144	.97928	.88206	70157	.61797	.53858	.46325	.39184	. 52415	19888	.14037	.13790	.02509	.03147	.03676	04543	.04919	•05271	•05603	61660.	.06516	.06800	07070	07508	.07866	.08369	.09331 10251	-11142	. 12011	.12862
	lsochore Derivative MPa/K	3.106776 2.984694	2.731400	2.313339	2,137453	1.978565	1.701473	1.579410	1.466364	1.262003	1.170707	1.083898	1.001872	850100	.779469	.711779	.646646	,583666	.522582	402346	.341241	.338550	。012880	.010948	.009714	000000	.007622	0007172	.006791	.006460	.005913	•005682	.005473	005108	.004948	.004661	.004192	.003517	.003263	.003046
	Z	.16876	.13600	. 12646	.11844	,11160	10064	.09621	09233	08891	.08327	.03094	.07891	07563	.07436	.07333	.07255	.07203	07197	.07261	.07399	.07407	.69154	.73555	.76931	81758	.83580	.85137	.86483	09/80	.89621	.90444	91184	.97456	93006	•93966	95459	.97375	90086	.98499
	ity kg/m3	,73381E+03 ,72936E+03	.71918E+03	.69899E+03	,68894E+03	.67889E+03	.65871E+03	.64854E+03	。63827E+03	.02/88E+U5	.60662E+03	.59568E+03	. 58447E+03	• 5/294E+U5	.54868E+03	.53578E+03	.52220E+03	.50779E+03	.49252E+05	.45650E+03	.43443E+03	.43338E+03	.46421E+02	.42415E+02	*39395E+02	.35065F+02	.33398E+02	.31947E+02	.30663E+02	29215E+02	.27525E+02	.26654E+02	.25851E+02	.23103E+02 .24410F+02	.23760E+02	*22577E+02	.20578E+02	•17570E+02	.16399E+02	.15384E+02
	Density mol/L	.1664E+02	.1631E+02	.1585E+02	•1562E+02	.1540E+02	• 1494E+02		•1447E+02	1424E+UZ	• 1376E+02	•1351E+02	• 1325E+02	1272F+02			•1184E+02	•1152E+02	. 1110E+02	.1035E+02	.9852E+01	.9828E+01	.1053E+01	.9618E+00	.8934E+00	. 7952F+00	.7574E+00	.7245E+00	•6953E+00	.6457F+00	•6242E+00	•6044E+00	.5862E+00	.5536E+00	.5388E+00	. 5120E+00	4566E+00	.3984E+00	.3719E+00	.3489E+00
	Temp. K	85.656				140.000				190.000				250-000					300.000			330.429			350.000					410.000			450.000	450.000		500.000	540.000	620.000		700°000

	Dielectric Constant	2.09114 2.08145 2.05971	2.01831	1.97889	1.94071	1.92189	1.88447	1.84689	1.82788	1.80862	1.76901	1.74846	1.70514	1.68197	1.65739	1.63092	1.56847	1.54910	1.05787	1.00468	1.04646	1.04369	1.04138	1.03769	1.03617	1.03480	1.03244	1.03141	0,0000	0000000	0	0	0.00000		0.00000
	Vel. of Sound m/s	2031 2001 1932 1867	1804	1684	1566	1508	1393	1277	1219	1160	1042	981	920	794	728	099	587 508	464	192	200	223	231	239	253	259	265	275	280	285	294	303	7 100	3.15	85.4	370
	Fugacity/ Pressure Ratio	.52615E-09 .13442E-07		1 1 1 1		.11068E-02 .25284E-02		.99242E-02	3163E	.45966E-01	9964	3941E+0	. 1884 UE+00	1729E+0	9753E+0	1111	.58/66E+00 .69563E+00	.75305E+00	1 (1 1	9 9	.80411E+00	1111	.83400E+00	.85782E+00	.86801E+00	.87726E+00	89337E+0	.90043E+00	.90688E+00	.91836E+00	92817E+0	1 . 1 1	9559/E+00	.97255E+00	.97836E+00
	Cp J/(mol•K)	84.07 84.27 84.76	85.87	87.23	88.90	89.87	92.13	94.91	96.53	100.34	102,59	105.12	111 26	115.07	119.60	5.2	143.28	-	9	124.19	107.82	105.47	104.46	104.53	105,16	106.02	108.21	109,45	110.77	113.54	116.42	c' c	128.07	000	4.
	Cv J/(mol•K)	61.74	60.68	09.09	60°69 60°86	61.12	61.91						20°69°	7 4		75.88	80,50	-	84.31	82.77	82.61	83.63	84.91	87.92	89.54	91.20	94.60	96.32	98.04	101.46	104.84	11.43	123.70	. 60	4
29	Entropy J/(mol•K)	82.585 86.883 96.006	111.665	124.950	136.649	142.056	152,191	161.618	166.122	170,510	178.998	183,122	18/• 185	195.171	199,134		207.141	13.	246.756	248.653	255.161	258.079	260.876	266.227	268.816	271.359	276.340	278,786	281.206	285.978	0	299.853	308.796	10	st .
P = 2.2 MPa	Entha!py J/mol	134.0 507.8 1369.3	3087.8	4813.5	5684.7	7455.0	9275.4	11158.9	12127.5	13115.4	15153.3	16205.7	10282.1	19520.7	20690.2	21902.8	24519.4	246.	36396.3	37037.4	39313.2	40378.1	41426.9	424/0.0	44561.7	45617.4	47758.8	0	49948.0	52190.9	54490.4	59264.1	69507.5		80630.6
	Internal Energy J/mol	1.8 374.8 1234.4 2091.9	2949.0	4670.6	5559.7	7305.4	9120.9	10999.0	11964.7	12949.4	14980.5	16029.0	10101.	19329.8	20493.4	21699.1	242959.2	2	34533.6	55068.8	37006.4	37928.7	38844.6	40684.9	41617.0	42560.1	44484.3	45467.3	46464.8	48505.1	50606.8	54995.9	59629.2	 . M	0
Propane Isobar at	lsotherm Derivative MPa·m3/kg	3.03191 2.92380 2.69470	2.30205	1.97019	1.682091	1.54837	1.30444	1.08436	.98228	.88514	.70484	.62133	34206	.39560	.32809	.26411	.20555	.11663	.02293	.02680	.03816	.04266	.04673	.05402	.05736	.06054	.06656	.06942	.07220	.07758	.08274	.09258	. 10195	.11979	.12840
	Isochore Derivative MPa/K	5.106831 2.985329 2.732112	2.314167	1.979481	1.854909	1.580447	1.362308	1.171933	1.085183	1.003223	.851621	.781082	. /13511 640522	.585722	. 524669	.464822	.405401	.313314	.014859	.013410	.010352	.009465	.008772	.007736	.007333	.006983	.006400	.006153	.005929	005539	.005207	•004668	.004245	.003614	•003371
	Z	.18558 .17773 .16222	13909	.12275	.11069	.10581	.09778	.09448	.08901	.08676	.08315	.08174	09080	.07915	.07890	•07904	.07970	.08231	•66862	•69634	.77068	.79621	.81752	.85049	.86381	87550	.89506	.90331	91074	.92355	.93417	•95064	.95265	.97857	.98395
	sity kg/m3	.73385E+03 .72943E+03 .71926E+03	.69908E+03	.67899E+03	.66895E+U5 .65883E+03	.64866E+03	.62803E+03	.60681E+03	.59588E+03	.58469E+03	.56132E+03	• 54900E+03	. 55615E+U5	. 50830E+03	.49293E+03	•47618E+03	.45/49E+U5 .43583E+O3	.42308E+03	• 52083E+02	.49283E+02	.42056E+02	•39607E+02	.37568E+02	.34298E+02	.32945E+02	.31732E+02 .30632F+02	.29627E+02	.28704E+02	.27851E+02	.26321E+02	.24980E+02	.22729E+02	.20898E+02	. 18066E+02	.16940[+02
	Density mol/L	.1664E+02 .1654E+02 .1631E+02	.1585E+02	. 1540E+02	.151/E+02 .1494E+02	.1471E+02	.1424E+02	.1400E+02	.1351E+02	.1326E+02	.1273E+02	• 1245E+02	• 1216E+02	.1153E+02		• 1080E+02	.105/E+02 .9883E+01	.9594E+01	.1181E+01	.1118E+01	.9537E+00	.8982E+00	.8519E+00	.7778E+00	.7471E+00	.7196E+00 .6946F+00	.6719E+00	.6509E+00	.6316E+00	. 5969E+00	.5665E+00	.5154E+00	.4 792E+00	.4097E+00	.3842E+00
	Temp.	85.674 90.000 100.000	120.000	140.000	150.000		190.000	210.000	220.000	230.000	250.000	260.000	2/0°000	290.000	300.000	310,000	520,000	335.060	335.060	340.000	360,000	370.000	380.000	400.000	410.000	420.000	440.000	450.000	460.000	480.000	500.000	540.000	580.000	000.000	700°000

Table 21. (Continued) Propane Isobar at P = 2.4 MPa

Dielectric Constant	2.09120 2.08157 2.05983 2.05884 2.01845 1.99856 1.97906 1.95987 1.94090 1.92210	1.86600 1.84719 1.80821 1.78943 1.76947 1.72781 1.70581 1.65833 1.65833 1.65326 1.53351	1.06471 1.05415 1.05726 1.05265 1.04915 1.04395 1.04191 1.03854 1.03854 1.03464 0.00000 0.00000 0.00000 0.00000 0.00000
Vel。 of Sound m/s	2032 2001 1933 1868 1805 1744 1626 1567 1509 1452	1336 1278 1162 1162 1103 1044 983 922 860 797 732 664 664 654 654 654	188 189 205 217 226 235 243 268 273 273 273 288 293 317 317 317 318 318 318 318 318 318
Fugacity/ Pressure Ratio	94362E-10 49016E-09 12505E-07 16926E-05 14295E-05 84226E-05 37782E-04 13354E-03 10244E-02 23391E-02	91757E-02 16217E-01 226950E-01 42469E-01 63898E-01 92529E-01 12875E+00 17397E+00 22860E+00 22860E+00 22860E+00 2460E+00 25295E+00 25295E+00 264237E+00 64237E+00	74 183 E+0 74 370 E+0 76 73 1 E+0 80 48 0 E+0 83 39 1 E+0 83 39 1 E+0 84 62 1 E+0 85 73 2 E+0 85 73 2 E+0 86 73 8 E+0 87 65 7 E+0 89 96 0 E+0 99 120 4 E+0 99 22 68 E+0 99 27 8 E+0
Cp J/(mol•K)		248842000000000000000000000000000000000	148.32 145.40 1121.59 1121.00 107.07 106.27 106.20 108.02 109.05 110.20 111.43 1112.73 1112.73 112.86 1139.24
Cv J/(mol•K)	61.74 60.69 60.69 60.60 60.61 60.61 60.61 60.87 60.87	652,44 653,06 653,06 654,78 657,70 69,09 72,15 72,92 73,92 73,92 73,05 88,05	86.32 85.36 83.55 84.25 84.25 86.76 86.76 87.77 96.47 99.87 99.87 111.49 123.33
Entropy J/(mol•K)	82.587 86.866 95.989 104.183 111.647 120.931 130.944 136.628 147.203	156.956 161.592 170.481 174.767 178.085 187.142 187.142 191.149 195.121 195.077 203.043 211.184	246.459 246.459 255.869 255.844 259.722 262.491 270.378
Enthalpy J/mol	146°.2 518°.3 1579°.8 3098°.2 3959°.0 4823°.8 56923°.8 56923°.8 56923°.8 56923°.8		36456.4 37856.7 37856.7 39023.9 40131.6 41210.8 42276.7 454401.3 4545.1 47630.4 46545.1 47630.4 48338.4 52089.3 52089.3 54398.5 54398.5 54398.5 54308.7 74914.0
Internal Energy J/mol	2.0 373.3 1232.7 2090.0 2946.8 3805.4 4668.0 5556.8 6414.0 7501.8	10046.6 10993.6 11958.7 12942.8 13946.9 14972.1 16019.6 17091.0 18188.6 19315.4 20476.3 22933.1 24261.6	34634.5 34708.9 35804.9 35804.9 38689.0 39622.6 42452.7 43415.4 44530.5 44539.8 46381.1 47397.9 50537.7 59577.3 69452.3
Sotherm Derivative MPa·m3/kg	3.03367 2.92605 2.69698 2.49144 2.30442 2.13235 1.97266 1.82344 1.68325 1.55102	1.19448 1.08727 988527 79588 79588 54553 47046 39934 39934 39934 26824 26824	02074 02133 02888 03482 04421 04824 05550 05550 06511 06511 07550 077096 07376 07376 07376 07140
sochore Derivative MPa/K	3.106888 2.985964 2.732825 2.511307 2.314994 2.139200 1.980397 1.85865 1.703466 1.581484 1.468522	1.265247 1.173156 1.0086465 1.004570 .926947 .715234 .715234 .650388 .587762 .56935 .467389 .408401 .348751	017029 015750 015782 012089 010031 000327 0007841 007751 0007841 007751 006601 006601 006565 006569 006569 006569
2	.20240 .19387 .16516 .15171 .15171 .1208 .12073 .11541	. 10304 . 09986 . 09706 . 09462 . 09249 . 08691 . 08697 . 08609 . 08609 . 08676 . 08676	.64563 .764997 .74379 .77380 .79816 .81851 .85887 .85887 .86587 .86587 .87539 .88562 .89475 .90295 .91705 .91705
si†y kg/m3	73590E+03 72950E+03 71933E+03 66917E+03 66917E+03 66916E+03 66904E+03 65895E+03 64879E+03 64879E+03	.61768E+03 .60699E+03 .58492E+03 .57345E+03 .57345E+03 .55161E+03 .54932E+03 .53651E+03 .52306E+03 .52306E+03 .47632E+03 .47693E+03 .47693E+03 .47693E+03 .47693E+03	558090E+02 57599E+02 51581E+02 44459E+02 44459E+02 38072E+02 38072E+02 38072E+02 36490E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35082E+02 35085E+02 31614E+02 27412E+02
Density mol/L	1664E+02 1654E+02 1631E+02 1608E+02 1586E+02 1540E+02 1540E+02 1540E+02 1494E+02 1471E+02 1471E+02	1401E+02 1376E+02 1326E+02 1326E+02 1306E+02 1276E+02 1217E+02 1217E+02 1186E+02 119E+02 119E+02 1082E+02 1040E+03	1517E+01 1306E+01 1008E+01 1008E+01 9517E+00 9042E+00 8634E+00 8634E+00 7668E+00 7668E+00 7668E+00 7668E+00 7169E+00 6556E+00 6556E+00 6556E+00 6746E+00 6516E+
Temp. K	85.693 90.000 100.000 110.000 120.000 140.000 150.000 170.000 180.000	200,000 210,000 220,000 220,000 240,000 250,000 270,000 280,000 290,000 310,000 330,000 3330,000	559, 588 540, 000 550, 000 550, 000 570, 000 590, 000 410, 000 440, 000 450, 000 450, 000 450, 000 650, 000 650, 000 650, 000 650, 000 660, 000

	Dielectric Constant	2.09127 2.08168 2.05995 2.03897	2.01860 1.99872	1.96005	1.92231	1.88496	1.82854	1.80935	1.76992	1.74948	1.70648	1.68354	1.65926	1.60471	1.57249	1.51783	1.07206	1.05952	1.05505	1.04873	1.04632	1.04239	1.03928	1.03794	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
	Vel. of Sound I m/s	2032 2002 1933 1868	1745	1626	1510	1395	1280	1164	1046	986	863	800	755	597	521 434	400	184	210	221	239	246	259	265	276	281	291	300	516 331	345	3.58
	Fugacity/ Pressure Ratio	.89249E-10 .45983E-09 .11714E-07	.13364E-05 .78673E-05	.12457E-03	95471E-03	45005E-02 85429E-02	.15094E-01	39512E-01	85873E-01	.11973E+00	21255E+00	,27236E+00	. 54 125E +00	50449E+00	.59/33E+00	•73121E+00	.73121E+00		.78964E+00	82134E+00	83471E+00	ا لنا ا	87656E+00	88483E+00	89239E+00	90580E+00	9	.93567E+00	96044E+00	97563E+00
	Cp J/(mol•K)			700	89.84	92.09		98.25		104.95		114.70	174.46	131.36	210	0.07	162.43	+ 🔿		108.55	107.96	108.37	109,95	110,98	112.12	14	117.32	128.57	134.08	139.40
	Cv J/(mol•K)	61.75 61.55 60.88	60.61	60.71	61.14	62.45	63.07	64.62	09.99	67.78	70.55	72.15	75.88	78.04	80.44 83.18	84.27	88.37	84.62	85.02	87.18	88.58	91.66	95.29	96.62	98,30	101.67	105.01	117.81	123.77	129.41
O	Entropy J/(mol•K)	82,589 86,849 95,971	111.629	130.924	142.013	152.145	161.566	170.452	178.930	183.049	191, 105	195.071	020.661	206.976	211.078	216,998	246.126	252.441	255.624	261.436	264.175	269.446	274.521	277.003	279.455	284.279	289.012	298.255	315.993	324.542 332.893
P = 2.6 MPa	Enthalpy J/mol	158.4 528.9 1390.4 2249.7	3108.6 3969.4 4834.1	5705.2	7474.9	9294.6	12145.0	13132.1	15167.8	16218.8	18395.3	19526.3	20691.4	23157.0	25937.1	26482.7	36486.8	38706.4	39868.0	42075.4	43157.4	45318.0	46405.0		49719.9	51987.0	54306.2	59110.5 64140.5	69394.1	74864.5 80543.0
	Internal Energy J/mol	2.2 371.7 1231.0 2088.0	2944 ° 7 3803 ° 0	5533.8	7298.2	9112.2	11952.7	12936.2	14963.8	16010.2	18176.3	19301.2	20459.4	22907.4	25659.5	26197.7	34709.5	36567.0	37560.3	39476.9	40427.4	42342.5	45515.0	5288	46296.2	48353.0	50468.0	59525.3	64406.0	69510.3 74827.7
Propane Isobar at	isotherm Derivative MPa·m3/kg	3.03543 2.92830 2.69927 2.49377	2.50679	1.82596	1.55366	1.30999	1.09019	.89129	.71135	.62804	.47405	.40307	.22590	.21215	.09984	*08098	.01853	.03127	.03680	.04593	.04991	.05713	.06366	.06674	.06972	.07542	.08086	.10086	.11018	.12799
	Isochore Derivative MPa/K	3,106946 2,986599 2,733538 2,512082	2.515821 2.140073 1.081212	1.836820	1.582519	1.266416	1.087744	1.005914	.854629	.784287	.652242	.589788	469924	.411349	.290613	.267655	.019420	.014111	.012548	.010541	.009835	.008748	.007937	.007601	.007299	.006780	.006345	.005116	.004686	.004031
	7	.21920 .21001 .19168 .17673	.16454 .15390	.13738	.12500	.11550	.10815	.10246	.09817	.09649	.09408	•09336	.09502	.09380	.09821	08660°	.62236	.71475	.75014	.80134	.82084	.85208	.87610	.88614	.89514	.91056	.92327	.94284	.96762	.98198
	ity kg/m3	.73395E+03 .72957E+03 .71941E+03	.69925E+03 .68922E+03	.66915E+03	.64892E+03	.62834E+03	.60717E+03	.58515E+03	.56189E+03	.54964E+03	.52348E+03	. 50930E+03	.49414E+U5 .47767E+U3	.45942E+03	.45849E+U5	.40228E+03	.64511E+02	.53591E+02	.49683E+02	.44123E+02	.41998E+02	.38532E+02	.35772E+02	.34581E+02	.33489E+02	.31550E+02	.29871E+02	.24843E+02	LU L	.20061E+02
	Density mol/L	.1664E+02 .1654E+02 .1631E+02 .1609E+02	.1563E+02 .1563E+02	.1517E+02	• 1472E+02 • 1472E+02 • 1448F+02		.1377E+02	.1327E+02	.1274E+02	.1246E+02	.1187E+02	•1155E+02	.1121E+02 .1083F+02	.1042E+02	.9344E+01	.9123E+01	.1463E+01	. 1215E+01	.1127E+01	.1001E+01	.9524E+00	.8738E+00	.8112E+00	.7842E+00	.7594E+00	.7155E+00	•6774E+00	.5634E+00	. 5212E+00	.4549E+00
	Temp.	85.711 90.000 100.000 110.000	120.000	150.000	170,000	190.000	210.000	230,000	250.000	260.000	280,000	290.000	310,000	320.000	340.000	343,455	343,455	360.000	370.000	390,000	400.000	420.000	440.000	450.000	460.000	480.000	500.000	580,000	620,000	700.000

Table 21. (Continued) Propane Isobar at P = 2.8 MPa

					La d						t		
Temp.	Density mol/L	sity kg/m3	Z	Isochore Derivative MPa/K	lsotherm Derivative MPa·m3/kg	Internal Energy J/mol	Enthalpy J/mol	Entropy J/(moi•K)	Cv J/(mol•K)	Cp J/(mol∘K)	rugacity/ Pressure Ratio	Vel. of Sound m/s	Dielectric
85.730	, 1664E+02	.73400E+03	.23600	3,107005	3.03719	2.4	170.6	82.591	61.76	84.06	.84915E-10	2033	2.09134
000.000		. 71948E+03	.20640	2.734251	2,70156	1229.3	1400.9	95,954	61.17	•74	.11039E-07	1934	2.06007
10.000	.1586E+02	./0959E+05 .69934E+03	17696	2.316648	2.30916	2942.5	3119.1	111,611	60.71	980	.12567E-05	1807	2.01874
30.000	-	.68932E+03	.16572	2.140946	2,13718	3800.6	3979.7	118.489	60.62	50	.73924E-05	1746	1.99887
40.000	.1540E+02	.67930E+03	. 15615	1.982227	1.97759	4662.7	4844.4	124.893	60.62	21	.32852E-04	1686	1.97939
50.000	•1518E+02	.66926E+03	14795	1.83/1/5	1.82848	5707 5	5/15.4	150.904	60. / 1	ς α γ	*11690E-05	1560	1.96025
000.00		. 64905F+03		1.583553	1.55630	7294-7	7484.9	141.992	0 -	80.80	89508F-03	1511	1,92252
80,000	1449E+02	63883E+03	, 12914	1.470675	1.43130	8194.2	8387.5	147.159	. 10	90.89	.20423E-02	1454	1.90385
90.000		.62849E+03	.12436	1.365672	1.31275	9107.8	9304.2	152,121	61.93	92.07	.42163E-02	1396	1.88521
200.000	.1401E+02	.61801E+03	.12015	1,267583	1.20016	10036.9	10236。7	156.907	62.46	.37	.80011E-02	1339	1.86654
210.000	• 1377E+02	.60736E+03	.11643	1,175597	1.09310	10982.9	11186.2	161.540	63.08	ΛI (14133E	1281	1.84778
230.000	. 1555E+0Z	58537F+03	11030	1.007255	89436	12929-6	1212000	170.423	64.67	98-70	.2547/E-01	1165	1.80971
	.1302E+02	.57395E+03	.10781	.929777	.80220	13932.2	14147.3	174.705	65.56	8	.55620E-01	1107	1.79024
250.000	-	.56217E+03	-	.856125	.71459	14955.5	15175.2	178.897	9	.39	.80343E-01	1048	1.77036
260.000	.1247E+02	• 54996E+03	.10386	.785880	.63139	16000.9	16225.4	183.012	67.79	87	.11200E+00	988	1.74998
	.1218E+02	• 53724E+03	.10238	.718656	. 55244	17069.7	17299.5	187.063	69.10	990	.15132E+00	927	1.72896
	.1188E+02	.52590E+05	.10125	.654085	.41762	18164.1	18599 8	191.060	70.55	S L	. 19880E+00	866	1.0/0/14
300.000	.1122E+02	.49473E+03	10006	531403	.33978	20442.7	20692.3	198,963	73.93	85	31913F+00	739	1.66018
310.000	.1085E+02	.47840E+03	.10013	.472428	.27642	21637.7	21895.8	202.910	00		.39169E+00	672	1.63435
320,000	.1044E+02	.46035E+03	.10081	.414249	.21649	22882.2	150.	6.89	78.03	00	.47185E+00	602	1.60614
330,000	.9973E+01	•43977E+03	.10233	.355866	.15962	24194.3	475	210.975	80.41	0	.55874E+00	527	1.57441
347.291	.8879E+01	.41492E+US .39155E+O3	.10921	.246651	00990	26764.6	27079.9	218.663	85.45	177.53	.65121E±00	370	1.50188
347.291	.1620E+01	.71439E+02	.59855	.022076	.01629	34757.5	36485.8	245,747	90°48	180.24	.72106E+00	180	1.08004
350.000	.1547E+01	.68221E+02	.62194	.020268	.01928	35132.5	36942.4	247.053	88.39	°04	.72895E+00	186	1.07631
360.000	.1370E+01	.60407E+02	.68288	.016514	.02745	36307.7	38351.7	251.025	85.95		.75353E+00	203	1.06730
370,000	.1255E+01	•55362E+02	.72497	.014400	.03366	37353.4	39583.7	254.401	85.86	118.65	.77446E+00	215	1.06151
390,000	. 1102F+01	48593F+02	78359	012949	0.03091	39374.2	40/42.4	260.408	87.63		. /9269E+UU	222	1.05377
400.000	.1045E+01	.46093E+02	.80545	.011001	.04780	40291.1	42969.9	263.205	88.94	109.96	.82327E+00	243	1.05093
410.000	.9967E+00	.43953E+02	.82405	.010298	.05172	41257.9	44067.0	265.914	90.38	127	.83621E+00	250	1.04850
420.000	.9544E+00	.42087E+02	•84012 95415	006000	.05540	42229.2	45163.0	268.555	91.91	109.69	.84792E+00	257	1.04638
440.000	.8833F+00	38950F+02	86651	003500	06221	4,52000,5	7 7367	1410177	95.50	110 00	86827F±00	507	1.04421
450.000	.8528E+00	.37608E+02	.87749	.008371	.06540	45197.5	48480.7	276.184	96.78	111.81	.87714E+00	274	1.04132
460.000	.8251E+00	.36383E+02	.88730	.008024	.06848	46210.2	49603.8	278.653	98.44	112.85	.88525E+00	280	0.00000
470.000	.7996E+00	.35259E+02	.89612	.007713	07146	47236.0	50737.9	281.092	100.11	113.99	•89273E+00	285	0.0000
500.000	.7338F+00	.32358F+02	90400	00/431	07994	50397.7	54213.5	288,259	105.10	117.70	01189F±00	290	00000
540.000	.6641E+00	.29287E+02	.93900	.006160	09044	54817.6	59033.5	297.530	111.61	6 6	.93161E+00	316	0.00000
580,000	.6084E+00	•26831E+02	.95427	.005563	. 10033	59473.2	64075.1	306.534	117.86	00 (.94654E+00	331	0.00000
000.020	. 5625E+00	. 24804E+02	49696.	.00508/	.109/8	64559.8	-	ů	125.81	4°Z	.95809E+00	245	0,0000
700.000	.4904E+00	.21625E+02	.98104	.004366	.12780	74789.8	80499.6	332,226	134.77	144.62	.97431E+00	370	000000

(Continued)	COM O
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Table	1 chor
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ielectric Constant	2.09140 2.08190 2.06019 2.03923 2.01888	1.99902 1.97956 1.96041 1.94149	1.92273 1.90408 1.88546 1.86681 1.84808	1.81007 1.72964 1.72981 1.72953 1.72953	1.66109 1.66109 1.60754 1.57628 1.53950 1.48109	1.08881 1.06865 1.06327 1.05913 1.05913 1.04648 1.04648 1.04648 1.04648 0.00000 0.00000 0.00000 0.00000
Vel. of Sound D m/s			1513 1455 1340 1225	1167 1050 990 930 868	808 472 676 607 607 1583 1980	175 209 209 221 220 220 220 220 260 272 272 273 273 273 273 273 273 273 273
Fugacity/ Pressure Ratio	.81204E-10 .41160E-09 .10456E-07 .14105E-06	.69817E-05 .31006E-04 .11027E-03 .32800E-03	.84548E-05 .19238E-02 .39704E-02 .75320E-02 .13301E-01	.34788E-01 .52313E-01 .75555E-01 .10532E+00 .14226E+00	.23946E+00 .29999E+00 .36820E+00 .44357E+00 .52531E+00 .61237E+00 .70304E+00	71135E+00 77636E+00 77898E+00 77898E+00 81188E+00 82576F+00 82576F+00 84969E+00 86951E+00 86951E+00 88615E+00 88615E+00 90659E+00 90659E+00 90659E+00 90659E+00 90659E+00 90659E+00
Cp J/(mol·K)		86.49 87.20 87.98 88.85			114.35 118.61 123.76 130.28 139.19 153.31 185.21	203.65 143.02 125.50 117.95 114.14 112.20 111.33 111.36 111.56 111.56 115.60 118.27 123.60 139.72
Cv J/(mol•K)	61.77 61.57 61.18 60.90 60.72	60.63 60.63 60.90	61.16 61.50 61.94 62.47 63.09	64.63 65.57 66.62 67.80 69.11	72.16 73.93 75.88 78.02 80.39 83.04 86.25	92.71 86.82 87.64 86.82 87.21 88.12 90.69 92.17 95.31 96.94 96.94 100.23 101.89 105.19 117.91 123.84
Entropy J/(mol•K)	82.594 86.815 95.937 104.130	118 471 124 874 130 885 136 567	141.971 147.137 152.098 156.883 161.515	170.594 174.674 178.864 182.976 187.023	194.972 198.907 202.845 206.817 210.875 215.114 219.803	245.310 249.514 255.155 256.389 250.39 267.608 270.315 277.881 277.891 277.891 277.891 275.404 277.891 275.404 277.891 275.8035 280.345 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 280.35 2
Enthalpy J/mol	182.8 550.0 1411.4 2270.7 3129.5	3990.1 4854.7 5725.6 6604.9	7494.9 8397.3 9313.9 10246.1 11195.3	15148.9 14155.2 15182.5 16232.0 17305.2	19532.2 20693.3 21893.9 23144.3 24461.9 25881.7 27500.6	36450.7 37945.1 39273.7 40486.4 41644.8 42775.4 42775.4 42775.4 42775.4 45004.2 46116.3 46116.3 46120.2 56956.5 64009.9 69281.5
Internal e Energy J/mol		3798.2 4660.0 5527.9 6404.3	7291.1 8190.2 9103.4 10032.1 10977.6	12923.0 13924.8 14947.3 15991.6 17059.2	19273.0 20426.2 21617.8 22857.5 24162.0 25564.3 27156.3	34776.2 36008.2 37126.6 38162.7 39163.5 40149.2 41130.2 42112.9 44097.8 46122.8 47153.6 48197.6 50326.9 54757.6
Sotherm Sotherm Derivative MPa.m3/kg	3.03895 2.93280 2.70384 2.49842 2.31152	2.13960 1.98006 1.83100 1.69099	1.55893 1.43400 1.31552 1.20299 1.09600	.89742 .80534 .71783 .63472 .55589	.41048 .34364 .28048 .22079 .16427 .11036	.01403 .02327 .03035 .03612 .04114 .04565 .05729 .05729 .06074 .06074 .06072 .07329 .07329 .07329 .07329 .07329 .07329 .07329
Isochore Derivative MPa/K	3.107065 2.987871 2.734964 2.513632 2.317475	2.141818 1.983141 1.838730 1.706449	1.584587 1.471750 1.366790 1.268748 1.176813	1.008592 .931186 .857616 .787466 .720354	.593796 .533606 .474904 .417101 .359294 .299734 .233492	.025055 .019462 .016528 .014654 .013301 .010721 .010130 .009620 .008177 .008424 .008424 .008424 .008424 .008429 .006679 .006679
Z	.25278 .24227 .22112 .20388	.17753 .16728 .15847 .15083	.14417 .13834 .13321 .12869 .12471	.11813 .11546 .11316 .110962 .10838	.10752 .10708 .10713 .10933 .11228 .11831	.57390 .69795 .75547 .76519 .81026 .82796 .84333 .85683 .85683 .87944 .888899 .89759 .91246 .95155
ity kg/m3	.73404E+03 .72970E+03 .71955E+03 .70947E+03	.68941E+03 .67940E+03 .66937E+03	.64918E+03 .63897E+03 .62864E+03 .61818E+03 .60754E+03	.58559E+03 .57420E+03 .56245E+03 .55028E+03 .53760E+03	.51029E+03 .49531E+03 .47912E+03 .46127E+03 .44100E+03 .41678E+03 .38425E+03	.79005E+02 .68300E+02 .61613E+02 .56931E+02 .57374E+02 .47894E+02 .47894E+02 .47894E+02 .42703E+02 .42703E+02 .42891E+02 .39331E+02 .39331E+02 .394875E+02 .38081E+02 .38081E+02 .38081E+02 .38930E+02 .38930E+02 .38930E+02 .38930E+02 .38930E+02 .38930E+02 .38930E+02
Density mol/L	.1655E+02 .1655E+02 .1632E+02 .1609E+02 .1586E+02	.1563E+02 .1541E+02 .1518E+02 .1495E+02	. 1472E+02 . 1449E+02 . 1426E+02 . 1402E+02 . 1378E+02	.1528E+02 .1302E+02 .1275E+02 .1248E+02 .1219E+02	.1157E+02 .1123E+02 .1087E+02 .1046E+02 .1000E+02 .9451E+01 .8714E+01	1792E+01 1549E+01 1291E+01 1209E+01 1209E+01 1038E+01 9950E+00 9950E+00 9951E+00 9571E+00 9571E+00 9575E+00 8636E+00 8375E+00 8375E+00 7909E+00 7909E+00 7909E+00
Temp. A	85.748 90.000 100.000 110.000	130.000 140.000 150.000 160.000	170.000 180.000 190.000 200.000 210.000		290,000 300,000 310,000 320,000 330,000 350,000	350,923 360,000 370,000 380,000 400,000 410,000 420,000 450,000 450,000 450,000 660,000 590,000 590,000 500,000 500,000

Table 21. (Continued) Propane Isobar at P = 3.2 MPa

electric	.09147 .08201 .06031 .03936 .03936 .01902 .99918 .94005 .9294 .96058 .92951 .86708 .82951 .81042 .75098 .75098 .75098 .75098 .75010		
Vel. of Sound Di m/s C	2034 2003 1935 1935 1871 2 1888 1629 1574 1456 1399 1574 1169 1169 1110 1110 1052 871 871 871 871 871 871 871 871 871 871		2/6 281 287 296 314 0 329 374 0 357
Fugacity/ Pressure Ratio	78002E-10 .39216E-09 .99482E-08 .13404E-06 .1278E-05 .66233E-05 .9534E-04 .10448E-03 .10448E-03 .10448E-03 .10448E-03 .10448E-03 .10448E-03 .10448E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01 .20877E-01		.87116E+00 .87964E+00 .88745E+00 .90134E+00 .92362E+00 .95349E+00 .95349E+00
Cp J/(mol•K)	84, 25		115 4 40 118 4 7 7 123 9 5 124 8 9 9 139 8 9 144 8 8 9
Cv J/(mol•K)	61.78 61.78 60.91 60.91 60.92 60.73 60.73 60.73 62.95 62.95 62.95 62.95 63.09 63.09 63.09 64.64 65.05	885.94 887.98 895.98 895.96 887.99 887.99 887.99 887.99 887.99 887.99 887.99 887.99	98. /2 100.36 102.00 105.28 111.74 117.95 123.88 129.50
Entropy J/(mol•K)	82.596 86.798 95.920 104.113 111.575 1118.452 124.855 136.865 147.115 152.075 165.886 147.115 170.365 174.643 174.6	214,979 221,897 221,893 221,893 244,797 247,826 251,86 258,398 261,336 264,148 266,869 226,519 272,112	277162 279633 282.072 286.872 296206 305253 314055 322637
Enthalpy J/mol J	195.0 1422.0 2281.1 3140.0 4000.5 4865.0 5735.8 8407.1 10255.5 11204.5 112189.9 1528.7 1711.0 17311.0 18408.9 19535.4 21892.3		6956/-5 50516-2 51675-0 54026-4 58879-3 63944-7 69225-4 74717-5
Internal Energy J/mol	2.7 1225.9 2082.3 2082.3 2938.2 3795.8 4657.4 4657.4 4657.4 10027.3 10027.3 11935.0 11935.0 11935.0 11935.0 11935.0 11935.0 11935.0 11935.0 11935.0	7876.8 77876.8 77876.8 44761.4 44761.4 7961.7 8993.9 0001.1 1993.1 2991.4 23996.3	46054.2 48118.6 50255.5 59368.9 69385.5 74714.3
sotherm Derivative MPa • m3/kg	2.04071 2.05005 2.050075 2.050075 2.050075 2.01389 1.08355 1.08355 1.08355 1.09891 1.0		.06599 .06916 .07223 .07810 .08906 .09929 .10902
lsochore Derivative MPa/K	2.988507 2.735677 2.514406 2.514406 2.518301 2.142690 1.984055 1.839683 1.472823 1.269912 1.178028 1.009926 1.0	.304023 .240033 .240033 .207073 .028442 .023272 .016567 .014880 .015614 .011796 .011109	.009159 .008800 .008178 .007210 .005482 .005439
J Z	26956 225840 225840 201745 20218 17841 16900 16900 173723 17273 12296 12296 12296 12596 12		.88184 .88184 .997110 .93140 .94887 .96181
ity kg/m3	72409E+03 772977E+03 71963E+03 69951E+03 69951E+03 66948E+03 66948E+03 66948E+03 66948E+03 66948E+03 66948E+03 66948E+03 6795E+03 6772E+03 57444E+03 57744E+03 57744E+03 57744E+03 57744E+03 57744E+03 5776E+03 5776E+03 5776E+03 5776E+03	418556+03 418556+03 4387556+03 588636+03 686106+02 686106+02 686106+02 583316+02 583316+02 593516+02 474176+02 474176+02 474176+02	.425555402 .40949E+02 .39679E+02 .37421E+02 .3744E+02 .30838E+02 .28461E+02
Density mol/L	1655E+02 1655E+02 1609E+02 1508E+02 154E+02 1518E+02 1518E+02 1472E+02 1472E+02 1472E+02 1472E+02 1472E+02 1472E+02 1472E+02 1538E+02 1538E+02 1538E+02 1548E+02 1548E+02 1548E+02 1548E+02 1558E+02 1576	_	.9286E+00 .8286E+00 .8898E+00 .8486E+00 .6993E+00 .6454E+00 .6002E+00
Temp.	85.767 90.000 1100.000 120.000 120.000 150.000 150.000 150.000 170.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000		470,000 480,000 500,000 540,000 580,000 620,000 660,000

	Dielectric Constant	2.09153 2.08213 2.06043 2.03949 2.01916	1.99933 1.97989 1.96076	1.94187 1.92315 1.90453	1.88595	1.84867	1.81078	1.77170	1.73066	1.68659	1.66288	1.61026	5446 5003 4497	1.10979	1.08596	1.07096	1.06243	1.05648	1.05195	00000	0.00000	0.00000		0 0 0
	Vel. of Sound m/s	2034 2004 1936 1871 1809	1748 1689 1630	1572 1515 1457	1400	1286	1170	1053	934	812	749	616	375 375	165	195	221	240	255	262	274	28.5	295 315	320	357
	Fugacity/ Pressure Ratio	.75218E-10 .37510E-09 .95020E-08 .12788E-06	.63079E-05 .27975E-04 .99374E-04	.29529E-03 .75869E-03	.35660E-02 .67609E-02	.11953E-01	.31182E-01	.67679E-01	. 12737E+00	.21434E+00	.26850E+00 .32955E+00	.39704E+00	.54844E+00 .63011E+00	.69297E+00	.72840E+00	•77154E+00		.83210E+00	.84379E+00 .85446E+00	.86421E+00	.88145E+00	.89614E+00	.93750E+00	7 8 7
	Cp J/(mol•K)	84.06 84.25 84.73 85.26 85.84				94.73	98.07 100.03	102.20	107.36	114.01	118.15	129.29	173.98	284.05	10,4	67	115.40	113.99	114.11		0.10	119.28	129.60	145.02
	Cv J/(mol•K)	61.78 61.59 61.20 60.91 60.73	60.65 60.65 60.74	60.91	61.95	63.82	64.65 65.58	66.64 67.81	69.12	72.17	73.94	78.00	82.93 85.87 88.94	97.83	89.33	89.23	91.36	94.17	95.70	98.87	102.12	105.38	118.00	129.53
Ō	Entropy J/(mol•K)	82.598 86.781 95.902 104.095	118.434 124.836 130.845	136.526 141.928 147.092	152.052	161 •465 165 •958	170°336	178.797 182.904	186.944	194.875	198.796 202.716	206.663	219.359	4 L	250.487	257.399	263.296	268.748	271.369	276.463	281.404	286.227	304.663	322.074
P = 3.4 MPa	Enthalpy J/mol		4010.9 4875.3 5746.0	6625.1 7514.8 8416.9	9333.1	1213.6	13165.8	15197.3	17316.8	19538.6	20695.7		25833.7 27390.7 28856.0	M M	38544.3	41168.2	43525.9	45815.2	46955.4	49247.1	51569.2	53932.1	63879.5	74668.9
Isobar at B	Internal Energy J/mol	2.9 365.7 1224.2 2080.4 2936.1	3793.5 4654.7 5522.1	6397.8 7283.9 8182.4	9094.7	11929.1	12909.9	14931.0	17038.3	19245.3	20393.7	22809.4	25476.9 27006.8 28434.8	34706.1	36587.6	38813.9	40861.1	42879.0	43892.6	45944.2	48038.8	50183.5	59316.5	69344.1 74676.7
Propane	Isotherm Derivative MPa •m3/kg	3.04247 2.93730 2.70841 2.50307 2.31626	2.14443 1.98499 1.83604	1.69614 1.56420 1.43939	1.20865	1.00019	.90353	.72429	.48827	.41784	.35129	.22928	.12043	.00945	.02310	.03609	.04585	.05406	.05780	.06475	.07117	.07719	.09879	.12727
	lsochore Derivative MPa/K	3.107187 2.989144 2.736390 2.515181 2.319128	2.143562 1.984968 1.840636	1.708433 1.586650 1.473896	1.369023	1.179240	1.011257	.860583	.659551	.597748	.537956	.422676	.246166	.032368	.021991	.016618	.013893	.012139	.011465 .010882	.010372	.009518	.008824	.006954	.005818
	Z	.28633 .27453 .25055 .23101	.20115 .18953 .17954	.17088	.15090	.13727	.13378	.12812	.12407	.12162	.12107	.12170	.13192	.52027	.63603	.72604	.78171	.82127	.85719	.86359	.88460	.90169	94621	.97035
	sity kg/m3	.73414E+03 .72984E+03 .71970E+03 .70963E+03	.68960E+03 .67960E+03 .66959E+03	.65954E+03 .64944E+03 .63925E+03	.62895E+03	.60790E+03	.58604E+03	.56300E+03	.53832E+03	.51125E+03	.49646E+03	.46304E+03	.42025E+03 .39055E+03	.96911E+02		.63684E+02	.56263E+02	.51062E+02	.48953E+02 .47078E+02	.45393E+02	.42468E+02	.39997E+02 .35998E+02	.32858E+02	.26330E+02
	Density mol/L	.1665E+02 .1655E+02 .1632E+02 .1609E+02 .1586E+02	.1564E+02 .1541E+02 .1518E+02	.1496E+02 .1473E+02 .1450F+02	.1426E+02	.1379E+02	.1329E+02 .1303E+02	.1277E+02 .1249E+02	.1221E+02	.1159E+02	.1126E+02 .1090E+02	.1050E+02	.9530E+01 .8857E+01	.2198E+01	.1738E+01	. 1444E+01	.1276E+01	.1158E+01	.1110E+01 .1068E+01	.1029E+01	.9631E+00	.9070E+00 .8163E+00	.7451E+00 .6871F+00	.6385E+00 .5971E+00
	Temp.	85,785 90,000 100,000 110,000	130.000 140.000 150.000	160.000	190.000	210.000	230.000	250.000	270.000	290.000	300.000	320.000	340.000 350.000	357.647	370.000	390.000	410.000	430.000	440.000	460.000	480.000	500.000	580.000	700.000

Table 21. (Continued) Propane Isobar at P = 3.6 MPa

Dielectric Constant	2.09160 2.08224 2.06056 2.03963 2.01931	1.99948 1.98005 1.94206 1.92336	1.90476 1.88620 1.86762 1.84896 1.83016	1.75198 1.75198 1.75122 1.68733 1.66576	1.65869 1.58159 1.54711 1.50439 1.43778	1.02299 1.09705 1.08519 1.06752 1.06752 1.06074 1.05567 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000	
Vel. of Sound m/s	2034 2005 1937 1872 1810	1749 1690 1531 1573	1458 1401 1344 1287 1172	996 937 815 752	088 550 550 286 253 253	160 187 204 227 227 227 227 227 228 237 238 343 357 357 357	
Fugacity/ Pressure Ratio	0 0 0 0 0	.60283E-05 .26717E-04 .94849E-04 .28170E-03	.35979E-02 .53979E-02 .64403E-02 .11364E-01 .18859E-01		.3/154/E+00 .3/76/E+00 .44/40/E+00 .52/182/E+00 .599/2/E+00 .6/822/E+00	.68420E+00 .71268E+00 .75770E+00 .75912E+00 .77796E+00 .80976E+00 .82339E+00 .83575E+00 .84702E+00 .84702E+00 .85731E+00 .85731E+00 .84902E+00 .84902E+00 .84902E+00 .84902E+00 .84902E+00 .84902E+00 .84902E+00 .84902E+00	
Cp J/(mol•K)	84.06 84.25 84.25 85.26 85.83	86.47 87.95 88.81 89.76	90 . 82 91 . 98 94 . 27 96 . 28	102.14 104.55 107.26 113.85	128.82 136.74 148.37 169.81 253.64 276.53	362.65 167.19 137.93 126.50 120.81 115.46 115.32 115.32 115.32 115.83 117.72 116.83 117.72 117.72 117.72 117.72 117.72	l .
Cv J/(mol•K)	61.79 61.59 61.20 60.92 60.74	60.66 60.66 60.75 60.92	61.53 61.96 62.49 63.11 63.83	66.00 60.00 60.00 72.00 72.00 72.00 72.00 72.00 72.00 72.00 73.00 70 70 70 70 70 70 70 70 70 70 70 70 7	75.00 80.33 82.33 85.72 89.56	91.07 91.07 89.70 89.85 90.62 91.71 93.00 94.41 95.02 100.62 100.62 111.87 111.87 111.87	
Entropy J/(mol•K)	82.600 86.765 95.885 104.077	118.415 124.816 130.825 136.505	147.070 152.029 156.810 161.438 165.931	178.764 186.905 190.887 194.827	202.653 206.588 210.587 214.723 224.593 225.144	243.424 248.979 252.976 256.392 259.516 262.458 267.998 270.650 273.244 275.790 278.294 275.790 278.294 275.790 373.244 373.295	1
Enthalpy J/mol	219.3 581.7 1443.0 2302.1 3160.8	4021.3 4885.6 5756.2 6635.2 7524.8	8426.7 9342.8 10274.4 11222.8 12189.1 13174.2	15204.7 15252.0 17322.6 18418.3 19541.9	21889.6 23128.1 24426.8 25811.9 27344.1 29273.1	36066.8 38094.8 39593.3 40908.2 42141.8 43333.2 44562.0 47967.2 49125.3 50289.8 51462.5 53837.2 58724.5 63814.5 69113.8	
Internal Energy J/mol		3791.1 4652.1 5519.2 6394.6 7280.4	8178.4 9090.4 10017.8 10961.7 11923.3	14922.8 15964.0 17027.9 18116.3 19231.6	21559.7 22785.9 24069.7 25435.6 26940.5 28816.4	34597.4 36251.7 37504.3 38622.0 39683.6 40718.9 41742.7 41742.7 44815.8 44815.8 44815.9 44899.9 47958.0 50110.9 59264.1 64174.8	
Isotherm Derivative MPa.m3/kg	3.04423 2.93955 2.71070 2.50540 2.31863	2.14684 1.98745 1.83855 1.69871 1.5684	1.44208 1.52380 1.21148 1.10471 1.00316	. 72751 . 64469 . 56616 . 49180 . 42149	.25248 .17786 .12533 .07524 .02508	00715 01905 02708 03346 03894 04383 04830 05244 05500 06687 06687 07628 07628 08771 09829	
lsochore Derivative MPa/K	3.107249 2.989781 2.737103 2.515956 2.319954	2.144433 1.985881 1.841588 1.709424 1.587680	1.474966 1.370136 1.272234 1.180450 1.012584	.955569 .862060 .725402 .661353 .599703	.482163 .425401 .369126 .312155 .251819 .176991	0.025678 0.025678 0.018542 0.015263 0.015263 0.012453 0.01710 0.010259 0.008308 0.008308 0.008308	
7	.30309 .29065 .26527 .24457	.21295 .20065 .19007 .18090	.15974 .15974 .15431 .14550	13559 13522 13128 12975 12866	12/99 12862 13016 13311 15270 15258	.48986 .59911 .66118 .75914 .75914 .75914 .75914 .8228 .8428 .85560 .85560 .85560 .85560 .85560 .85560 .85560 .85560	
;i+y kg/m3	.73418E+03 .72991E+03 .71977E+03 .70971E+03	.68969E+03 .67970E+03 .66970E+03 .65966E+03	.63939E+03 .62910E+03 .61868E+03 .60808E+03 .59729E+03	.56328E+03 .56328E+03 .55121E+03 .52555E+03 .52555E+03 .49703E+03	.48121E+03 .46391E+03 .44451E+03 .42188E+03 .39332E+03 .34760E+03	.10804E+03 .86133E+02 .75994E+02 .69437E+02 .60724E+02 .57534E+02 .57534E+02 .57534E+02 .57534E+02 .57536E+02 .57536E+02 .5730E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48512E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02 .48514E+02	
Density	.1665E+02 .1655E+02 .1632E+02 .1609E+02	.1564E+02 .1541E+02 .1519E+02 .1496E+02 .1473E+02	. 1450E+02 . 1427E+02 . 1403E+02 . 1379E+02 . 1354E+02	. 1374 E+02 . 1277 E+02 . 1250 E+02 . 1192 E+02 . 1160 E+02	.1091E+02 .1052E+02 .1008E+02 .9567E+01 .8919E+01 .7883E+01	2450E+01 1723E+01 1725E+01 1575E+01 1377E+01 1377E+01 1305E+01 1142E+01 1100E+01 1100E+01 1062E+01 1062E+01 1062E+01 1077E+01 1062E+01 1077E+01 107	
Temp.	85.804 90.000 100.000 110.000	150.000 140.000 150.000 160.000	180.000 190.000 200.000 210.000 220.000	240.000 250.000 270.000 280.000 390.000	310,000 320,000 340,000 350,000 360,000	360.769 370.000 380.000 400.000 410.000 420.000 450.000 450.000 450.000 450.000 560.000 580.000 580.000 560.000	

Dielectric Constant 2.09167 2.08235 2.06068 2.03976 2.01945 1.99963 .96112 .94226 .77258 .75247 .58327 ,09435 .06515 63974 .07287 .98022 .90498 88644 .86789 84926 .83048 81149 .79222 e73178 ,71038 .68807 61288 50817 44778 40604 .08478 07805 .05949 00000000 0000000 0.000000 0.000000 0.00000 66464 .13940 .06867 Vel. of Sound 2005 1937 1873 1810 1750 1690 1632 1574 1517 1517 403 346 288 231 174 116 999 939 879 818 755 625 555 480 395 287 223 154 197 212 223 223 242 250 250 .34663E-09 .87561E-08 .11757E-06 .90811E-04 .26957E-03 .95970E+00 Fugacity/ .70648E-10 .57790E-05 25595E-04 .69199E-03 ,15759E-02 32478E-02 .61538E-02 .11564E+00 .15186E+00 . 19454E+00 .24368E+00 29909E+00 .42692E+00 .49802E+00 .57254E+00 .64793E+00 67565E+00 72378E+00 76671E+00 .78446E+00 85047E+00 .36036E+00 .74669E+00 .81474E+00 .82776E+00 .83963E+00 86044E+00 86961E+00 88589E+00 93165E+00 . 10856E-01 . 18011E-01 28342E-01 .67565E+00 696635+00 \$00365+00° 91196E+00 94683E+00 Pressure .42590E-01 .61474E-01 .85644E-01 Ratio Cp J/(mol•K) 84.05 84.24 84.73 85.25 85.83 88.80 88.80 89.75 90.80 91.96 93.25 94.67 96.25 107.17 110.21 113.68 201.65 02.07 136.02 147.00 166.28 122.50 128.37 226.19 514.00 32.32 17.03 16.60 17.01 18.41 20.35 25.03 35.30 18.17 30,13 555.60 20.41 J/(mol·K) J/(mol·K) 69.13 70.58 72.18 73.94 61.80 61.60 61.21 60.93 60.75 60.67 60.75 60.93 61.19 61.54 61.97 62.50 62.50 80.31 82.84 85.60 91.11 64.66 65.60 66.65 77.99 05.15 93.42 90.77 90.53 93.30 97.62 67.83 75.87 88.78 91.31 94.66 96.11 97.00 105.57 23.99 82.602 86.748 95.868 104.060 111.521 118.397 136.485 52.006 56.786 165.905 247.236 251.745 255.368 267.266 269.951 272.571 Entropy 30.806 47.048 70.279 94.779 98°988 210,496 261,629 280.145 521.052 74.551 78.731 82,833 86.866 202,590 206.514 214 .602 218,977 224.137 226.888 242,440 258,609 294.452 90.844 275,138 512,415 264,501 503.565 277,661 = 3.8 MPa Enthalpy J/mol 231.5 592.3 1453.6 2312.6 3171.3 4031.6 4895.9 5766.4 6645.3 8436.5 9352.4 11231.9 12197.9 13182.7 14187.1 15212.1 16258.8 17328.5 18423.1 23123.4 29134.3 39236.1 51354.8 20698.6 21888.6 25791.5 5787.6 37546.3 41910.6 43133.3 44325.0 45500°3 47833.8 27301.7 46668.0 49001.8 50174.7 58646.8 63749.4 69058.2 Ω 10013.0 10956.4 11917.4 14914.8 15955.0 17017.6 18104.5 Energy J/mol 5516.3 6391.4 7276.8 8174.5 39512.4 362.7 1220.8 2076.5 2931.8 3788.7 25395.8 43678.7 2896.9 47876.4 69261.3 74601.8 Propane | sobar at Internal 4649.4 3895.8 20361.8 1540.8 2762.9 9615.6 54410.9 5837.5 7238.0 41611.6 42645.3 59211.6 54128.6 26878.5 28661.7 54515.3 8416.1 5760.1 6813.1 Derivative MPa • m3/kg Isotherm 3.04600 2.94180 2.71298 2.50772 2.32099 2.14925 1.98992 .84107 .70128 .56947 .32656 1.10760 73072 64799 56957 49532 42513 35888 .44478 90962 81788 23763 18230 08070 ,03242 01282 01460 02380 04180 05483 05864 06226 08704 29643 00487 03663 06572 07538 62160 10792 04648 05080 06905 Derivative 372269 316027 257131 187831 3.107313 2.990418 2.737817 2.516730 2.520780 2.145304 1.842540 1.710415 1.588710 1.273392 1.273392 1.181658 1.095361 .863531 .793749 .727069 .020689 .015427 .014370 .013489 .012741 Sochore 601646 .011527 010170 006589 476036 .013908 936782 542232 428087 149532 042888 018410 016734 030513 024106 007922 484531 MPa/K 55546 63241 68294 72109 72167 77703 79855 81710 83330 25813 24001 22475 21176 20059 19092 18247 17508 16857 16284 15778 15332 14600 14305 14055 13848 13685 13568 13705 14545 15789 17032 45519 31984 27997 86024 87157 89096 92020 94098 3501 3491 13551 84757 95628 97675 .55152E+03 .65978E+03 .64969E+03 .63952E+03 .60827E+03 .83864E+02 .61755E+02 .58693E+02 .70979E+03 .69977E+03 61884E+03 58648E+03 ,57518E+03 56355E+03 .52596E+03 49759E+03 .42344E+03 39588E+03 98063E+02 69873E+02 65396E+02 56057E+02 53746E+02 51692E+02 .45241E+02 40559E+02 72998E+03 71985E+03 68978E+03 67980E+03 .66981E+03 62925E+03 51220E+03 48189E+03 46476E+03 44562E+03 35458E+03 32531E+03 2172E+03 49847E+02 .48174E+02 36928E+02 33992F.+02 315516+02 .29477E+02 Density 1587E+02 1564E+02 1496E+02 1251E+02 1222E+02 450E+02 427E+02 355E+02 330E+02 304E+02 278E+02 162E+02 1128E+02 093E+02 1054E+02 .8041E+01 1902E+01 1716E+01 1483E+01 1400E+01 1331E+01 1271E+01 1655E+02 632E+02 610E+02 542E+02 403E+02 379E+02 193E+02 011E+02 665E+02 519E+02 9602E+01 8977E+01 1219E+01 9198E+00 8374E+00 1172E+01 1130E+01 .7709E+00 2224E+01 1585E+01 092E+01 1026E+01 2760E+0 mo I/L 330.000 340.000 350.000 120,000 140,000 140,000 150,000 160,000 170,000 180,000 200,000 210.000 220.000 230.000 240.000 250.000 380.000 420.000 85.822 90.000 280,000 520,000 560,000 563.742 570,000 400.000 410,000 450.000 260,000 500.000 510,000 563.742 140.000 000.091 180.000 500.000 560,000 10.000 270,000 290.000 170,000 540.000 580.000 520,000 00000 ¥

(Continued)

Table 21.

Table 21. (Continued) Propane Isobar at P = 4.0 MPa

Dielectric Constant	2.09173 2.08246 2.06080 2.03989 1.99979	1.98058 1.96130 1.92378 1.90521 1.8669 1.86816 1.84955 1.84955	79261 77301 77296 73234 71101 66550		1.16196 1.15102 1.0499 1.09269 1.07851 1.07851 1.06534 1.06534 1.06534 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000	
Vel. of Sound Im/s	2035 2006 1938 1873 1811 1751	1633 1518 1704 17404 1290 1233	1059 1001 941 882 759	629 560 487 304 193	147 166 190 230 230 247 269 275 281 342 356	
Fugacity/ Pressure Ratio	.68764E-10 .33466E-09 .84418E-08 .11322E-06 .94897E-05			40851E+00 40851E+00 47661E+00 54808E+00 62063E+00	.66721E+00 .68004E+00 .70971E+00 .73424E+00 .75548E+00 .77423E+00 .77423E+00 .80613E+00 .81983E+00 .81983E+00 .83230E+00 .83230E+00 .83230E+00 .84568E+00 .86377E+00 .86377E+00 .86377E+00 .86377E+00 .86377E+00 .86377E+00	
Cp J/(mol•K)			99.87 102.01 104.07 107.07 113.53	127.94 135.33 145.74 163.24 209.54 567.51	280.63 280.63 164.30 129.46 128.85 123.36 117.96 117.77 117.96 11	
Cv 1/(mol·K)	61.81 61.61 61.22 60.94 60.76 60.67	000 000 000 000 000 000 000 000 000 00	65.66 65.66 67.83 72.93 73.94	80.29 82.80 85.49 88.30	97.11.43 97.12 92.03 91.63 92.48 93.61 94.39 97.80 99.33 102.47 112.00 118.14	
Entropy J/(mol•K)	82.604 86.731 95.851 104.042 111.503	24, 78 150, 786 136, 465 141, 865 147, 026 151, 983 156, 762 161, 387	174,520 178,699 182,797 186,828 190,801 194,731	206.441 210.406 214.484 218.803 223.765	241.039 245.018 250.423 250.423 257.698 260.805 263.738 266.549 266.549 271.916 277.048 277.048 277.048 277.916 277.916 377.048 279.548 284.446 2279.548 303.052 303.052	
Enthalpy J/mol		4906.2 4906.2 6655.5 7544.7 8446.4 9362.0 10293.2 11241.1	14195.1 15219.6 16265.6 17334.4 18428.0 19548.7 20700.2	23119.0 23119.0 24706.5 2772.3 27263.0 29025.1	35343.5 36809.1 38833.7 440332.2 44142.7 442925.7 44520.1 45337.2 46520.1 47698.3 48876.6 50058.4 55445.6 55644.4 69002.7	
Internal Energy J/mol	361.3 1219.1 2074.6 2929.7 3786.3	4646.8 5513.4 6388.2 7273.3 8170.6 9081.8 10951.2	13888.6 14906.7 17007.4 18092.9 19204.6 20346.1	1-L0-mm	34086.1 35272.5 36935.7 38193.6 40416.6 41476.0 42523.8 45655.9 44614.4 45665.9 49964.0 59454.1 69220.0 74564.4	
sotherm Derivative MPa.m3/kg	3.04776 2.94405 2.71527 2.51004 2.32336 2.15167	1.99258 1.84358 1.57289 1.44747 1.32931 1.11049	. 82100 . 73393 . 65129 . 57296 . 42883 . 36265	.24176 .18668 .13489 .08601 .03907	.00263 .00954 .00957 .00957 .00957 .00957 .00957 .00957 .00658 .00658 .00658 .00658 .00658 .00658	
Isochore Derivative MPa/K	3.107377 2.991056 2.738530 2.517505 2.146175	1.98 / /05 1.843491 1.589738 1.477104 1.274548 1.182864 1.096621		.430737 .375352 .319785 .262156 .196760	.050854 .037598 .027545 .025301 .0167308 .0167316 .01578 .01578 .013731 .012373 .010872 .009452 .008418 .006981	
] 2		222287 221112 192093 18425 17740 16603	15362 15362 14786 14567 14269	.14239 .14391 .14683 .15219 .16361	.41254 .49947 .60072 .65952 .76264 .76364 .78698 .82423 .83423 .85508 .85503 .85503 .95449 .95449	
ity kg/m3	73428E+03 73004E+03 71992E+03 .70987E+03 .68986E+03	.6/990E+03 .66991E+03 .65989E+03 .65986E+03 .62940E+03 .61900E+03 .61900E+03	55582E+03 5582E+03 55183E+03 55937E+03 52636E+03 52636E+03 526463 52636E+03	.46559E+03 .46559E+03 .42495E+03 .39828E+03 .36018E+03	.14028E+03 .11480E+03 .92934E+02 .82478E+02 .75516E+02 .66145E+02 .65696E+02 .59755E+02 .59755E+02 .57197E+02 .57197E+02 .57197E+02 .57197E+02 .57197E+02 .57197E+02 .57197E+02 .57197E+02 .57376E+02 .57376E+02 .57376E+02 .57376E+02 .57376E+02 .57376E+02 .57376E+02	
Density mol/L	565E+02 556E+02 633E+02 510E+02 587E+02 564E+02	1542E+02 1519E+02 1474E+02 1474E+02 1427E+02 1427E+02 1427E+02 1580E+02		.1056E+02 .1056E+02 .9637E+01 .9032E+01 .8168E+01	3181E+01 2603E+01 2107E+01 1870E+01 1712E+01 1500E+01 1500E+01 1297E+01 1297E+01 1297E+01 1297E+01 1297E+01 1296E+01 1296E+01 1296E+01 1296E+01 1296E+01 1296E+01 1259E+00 88359E+00 7741E+00 7741E+00	
Temp. K		140,000 1150,000 170,000 1170,000 1180,000 220,000 220,000			356.571 370.000 380.000 400.000 410.000 420.000 450.000 450.000 450.000 450.000 500.000 500.000 620.000	

	6 MPa
con i inde	o = 4.24746
dolle 21.	ropane Isobar at P
	Propane

	Dielectric Constant	2.09181	2.06095	2.01976	9999	7807 9615	1.94269	1.92403	1.90549	1.88699	1.84901	1.83119	1.81228	1.79309	1.77355	1.75356	1.73302	1.71179	1 6668871	1 64203	1.61571	1.58690	1.55441	1,51581	1,46419	1.20348	1.10375	1.09334	1.08595	1.08025	1.07562	7 6 9	000000	0000000	0.00000	0.00000	0.000.0	0.00000	0.00000	0.00000	000000	0.00000	0.00000
	Vel. of Sound m/s	2036	1939	1812	1752	1634	1576	1519	1462	1405	1040	1234	1177	1120	1062	1003	944	0000	478	7007	635	567	495	416	322	139	700	214	225	235	777	757	266	273	279	285	290	300	509	27.00	3.12	356	369
	Fugacity/ Pressure Ratio	.66729E-10	.80962E-08	.90775E-06	.53088E-05	.23477E-04	.24665E-03	.63254E-03	9	.29639E-02	989425-02	16407E-01	.25806E-01	.38764E-01	.55932E-01	.77899E-01	.10516E+00	.13807E+00	22140E+00	• 22 149E+00	.32757E+00	.38814E+00	.45293E+00	.52101E+00	.59037E+00	•65776E+00	• 69205 E +00	-74160F+00	.76163E+00	.77948E+00	.79556E+00	• 81009E+00	.83536F+00	.84643E+00	.85660E+00	.86598E+00	.87465E+00	11 1	1 1 1	005785400	1 11	SE +0	1
	Cp J/(mol•K)	84.05	84.72	85.82	86.45	87.92	88.77	89.72	90°16	91.92	92.60	96.17	97.90							121 85	127.43	134.52			95.82	2533.66						110 25	200	119.50	120.04		121.62			VI	125 77	140.76	
	Cv J/(mol·K)	61.82	61.23	60.77	00.08	00.09	60.95	61.21	61.55	61.99	63.14	63.86	64.68	65.62	29.99	67.84	69, 15	70.60	72 05	CV.C/ CV.C/	77.98	80.27	82.75	85.38		117.78	95.34	92.32	92.99	94.01	95.23	96.59	99,53	101.06		104.20		8°9	112.08	<u> </u>	124 07	129.66	134.95
4.24746 MPa	Entropy J/(mol•K)	82.607	95.830	111.480	118.355	130.762	136.440	141.839	146.999	151.954	161.356	165.845	170.215	174.483	178.658	182.754	186.780	190 - 749	100 2400	702 453	206.352	210.297	214.344	218,600	223.376	238.665	252.057	256,557	259.787	262.805	265.677	268.445	273.748	276.314		281,318	°.76	288.574		206.162	444	319,975	0.0
P = 4.2474	Enthalpy J/mol	258.8	1477-1	3194.6	4054.9	4719°0	6668.0	7557.1	8458.5	9374.0	11252.4	12217.7	13201.6	14205.0	15228.8	16274.0	17341.8	18434.0	1.0000	20/02.4	23114.0	24395.1	25750.1	27219.2	28914.9	34540.9	3824/•0	41347.4	42656.9	43909.2	45129.7	46552.9	48719.4	49912.7	51110.2	52314.1	53525.9	55977.8		\cap N	° -	74465.7	80193.0
Isobar at	Internal Energy J/mol	3.7	1217.0	2927.1	3783.4	4040.0 5500.8	6384.2	7268.9	8165.8	9076.5	10002.4	11904.5	12882.5	13879.7	14896.8	15934 .8	16994 .8	18078.5	7.88161	20220.9	22712.6	23977.0	25311.2	26752.2	28403.1	33462.6	37889.9	39092.6	40216.2	41301.7	42368.7	45428.0	45547.3	6614	47690.3	48775.7	49871.8	52099.6	545// 9	50003	54005 I	69168.9	74518.2
Propane 1s	sotherm Derivative MPa·m3/kg	3.04994	2,71810	2.32629	2.15465	1.84669	1.70703	1.57534	1.45079	1.33272	1.11406	1-01275	.91642	.82485	.73788	.65536	.57716	.50315	645525	30520	.24683	.19205	•14066	.09240	.04671	060000	02450	03132	.03717	.04237	.04711	• 05149 05560	.05947	.06316	69990°	•00/0	.07337	.07963	.08556	00671	1,090.	11707	. 12662
	sochore Derivative MPa/K	3.107458 2.991845	2,739413	2.322627	2,147252	1.844667	1.712627	1.591009	1.478425	1.373732	1.18/35/3	1.098177	1.016859	.939884	.866806	.797222	.730771	.667118	. 5003943	240927	433966	.379087	.324290	.268038	.206239	.063444	0052900	022918	.020446	.018607	.017166	015934	.014182	.013461	.012829	.012269	.011767	.010904	.010185	6/6600	008170	.007473	006900*
	2	.35727	.31287	.26819	.25114	20007	.21331	.20387	.19560	.18832	17624	17125	.16686	.16303	.15972	.15690	.15456	15271	15052	15033	15087	.15237	.15526	.16048	.17099	.35050	62841	66229	.71598	.74667	.77226	0/940b	82939	.84396	.85692	.86852	.87897	.89/00	.9119/	02470	05231	.96515	.97502
	:1+y kg/m3	.73433E+03 .73013E+03	.72001E+03	.69996E+03	.68999E+03	.68005E+05	.66004E+03	.64998E+03	.63983E+03	.62959E+03	• 61921E+U3 60867E+03	.59793E+03	.58697E+03	.57573E+03	.56416E+03	.55221E+03	.53981E+03	.52685E+03	*51524E+U5	.49882E+UJ	•46660E+03	.44801E+03	.42675E+03	.40106E+03	*36596E+03	.17371E+03	. 10065E+U5	.83066E+02	.76740E+02	.71834E+02	.67838E+02	.044/bE+UZ	.59045F+02	.56792E+02	.54768E+02	.52933E+02	.51258E+02	.48296E+02	.45/44E+02	.43309E+02	38154F+02	.35364E+02	.33006E+02
	Density mol/L	.1665E+02	.1633E+02			. 1542E+02 1510F+02	• 1213E+02 • 1497E+02	_	•1451E+02		1 404E+02	.1356F+02		.1306E+02	.1279E+02	• 1252E+02	• 1224E+02	-	.	1096F±02	.1058E+02	.1016E+02	.9677E+01	.9095E+01	.8299E+01	.3939E+01	. 2418E+UI	-1884E+01	.1740E+01	.1629E+01	.1538E+01	.146ZE+UI	.1339F+01	.1288E+01	.1242E+01	.1200E+01	.1162E+01	.1095E+01	.105/E+01	986/6+00	8652F+00	.8020E+00	.7485E+00
	Temp.	85.864	100.000	120.000	130.000	140.000	160,000	170.000	180.000	190.000	210 000	220,000	230,000	240.000	250.000	260.000	270.000	280.000	290.000	500.000	320-000	330.000	340.000	350.000	360.000	370.000	390-000	400.000	410.000	420.000	130.000	440.000	450.000	470.000	480,000	490.000	500.000	520.000	540.000	580.000	620,000	660.000	700.000

= 4.4 MPa

۵.

Propane Isobar at

Dielectric Constant 0.0000000 2,09186 2,08268 2,06104 2,04015 2,04015 1,98071 1,96165 1,94283 1,92419 1,90566 1,88718 1,86869 .51820 .46870 .36835 .07940 1.07157 .58809 .58809 .55602 .09921 .83144 .81255 .79339 .77388 .73344 .66720 .08448 .69026 .13381 .09082 00000°C 0000000 00000000 00000000 Vel. of Sound .65617E-10 .31422E-09 .79038E-08 .23993E-03 .13991E-02 .28805E-02 .54530E-02 .25061E-01 .25061E-01 .37640E-01 .54303E-01 .75623E-01 .84170E+00 .85222E+00 .86191E+00 .87086E+00 .21497E+00 .26385E+00 .31793E+00 .37674E+00 .43967E+00 .50585E+00 .77241E+00 .78907E+00 .80411E+00 .83026E+00 .91265E+00 .92314E+00 .94044E+00 .51712E-05 .22856E-04 .80951E-04 .57340E+00 .64011E+00 Fugacity/ .88476E-06 .13402E+00 .17164E+00 .68092E+00 .70913E+00 .73302E+00 .75388E+00 90066E+00 95396E+00 .96468E+00 Pressure Ratio 93.18 94.59 94.59 95.14 99.77 101.28 106.89 106.89 106.89 113.22 113.22 113.22 113.22 113.22 120.83 139.78 139.78 139.78 139.78 120.01 120.01 120.01 120.01 120.01 120.01 120.01 120.01 120.01 120.01 120.01 84.05 84.23 84.71 85.24 85.81 86.44 87.91 87.91 88.77 89.71 30.96 35.94 40.89 28.52 J/(mol·K) 61.83 61.24 60.26 60.96 60.78 60.69 60.78 60.78 60.78 60.78 65.62 66.67 67.85 69,15 70,60 70,60 77,95 77,95 77,98 80,26 82,73 85,32 85,32 85,32 95,40 95,40 95,40 95,40 95.44 96.76 98.17 99.66 15.21 15.21 18.24 24.10 29.68 62.52 63.14 63.86 64.69 101.17 102.72 104.28 105.86 J/(mol·K) 82.609 86.697 95.817 111.467 118.341 124.740 130.747 136.982 141.822 141.822 141.822 141.822 151.937 156.714 174.459 178.633 182.727 186.751 190.717 198.528 202.407 206.298 210.232 214.260 218.481 223.163 247.288 252.076 255.833 259.157 262.234 265.147 267.944 Entropy 278.409 280.902 283.360 288.184 292.904 297.534 302.087 310.984 319.636 328.068 70.194 273,292 275.874 Enthalpy 20703.8 21886.6 23111.1 24388.4 25737.2 28856.7 31237.0 3781237.0 3781237.0 3781237.0 41538.3 42484.1 43760.5 449998.6 446215.2 268.0 624.0 1485.2 2344.1 3202.6 4926.9 5797.1 7564.7 7564.7 7564.7 11259.4 13208.1 14211.2 15234.5 16279.2 17346.4 18437.8 48621°2 49821°9 51025°7 52235°0 53451°7 55911°6 58412°9 60959°6 63554°3 68892.1 74428.9 80161.3 J/mol Energy J/mol 258.3 1215.7 1215.7 2070.8 2925.4 4641.6 5507.6 6581.8 8162.8 99073.2 10940.7 11900.1 12877.6 13874.3 14890.7 15928.0 16987.1 19178.1 20315.2 21485.6 28331.0 37683.5 38935.5 49814.6 52048.0 25283.7 69137.5 43339.5 22695.8 26712.4 56157.0 10086.8 11190.5 15473.0 16545.7 47625.8 56665.6 Interna 12270.4 14405.4 8715.0 54330.8 59053.5 ∞ 53989 Derivative MPa·m3/kg sotherm 5.05129 2.94855 2.271984 2.51469 2.55480 1.99750 1.84861 1.70899 1.57735 1.45284 1.2276 1.2276 1.01501 31873 19532 14417 09625 05117 00752 01309 02231 02949 03558 05035 06230 82723 74032 65787 57973 43598 37013 04096 04585 05853 24993 06935 07269 08507 09082 09635 0689 11690 Derivative .548515 .491487 .435930 .211482 .127123 .037135 3.107509 2.992332 2.739958 2.519054 2.323256 2.147915 .479237 .374577 .276855 .185269 .940938 .867917 .798399 .732024 381348 326995 271504 .019800 ,015842 .014156 .013474 .012872 1.845391 1.713380 1.591791 012334 Isochore .989527 607397 024695 021865 014936 166600 009436 007780 016911 .017861 MPa/K 27780 26013 24509 222094 220259 220259 116 20259 19505 17735 15757 16043 16558 17563 21136 52411 60785 66232 70325 73597 76507 78605 80585 85837 85190 86400 87488 89363 37003 35510 32408 29879 15581 15608 92224 93332 95098 .64351E+02 .61631E+02 .59224E+02 .57069E+02 .55121E+02 .53347E+02 .46722E+03 .44880E+03 .42782E+03 .40267E+03 .36908E+03 .29841E+03 .73437E+03 .73018E+03 .72007E+03 .68010E+03 .67013E+03 .66013E+03 54007E+03 52716E+03 51360E+03 .70003E+03 .63994E+03 .57591E+03 .56437E+03 .49924E+03 .98439E+02 .75495E+02 .60881E+03 36668E+02 55244E+03 11717E+03 80935E+02 67472E+02 47532E+02 45185E+02 71003E+03 61933E+03 58713E+03 43109E+02 39579E+02 Density 1542E+02 1610E+02 1587E+02 1565E+02 1451E+02 1428E+02 1306E+02 1280E+02 1225E+02 1195E+02 .1132E+02 .1097E+02 1018E+02 1025E+01 .8315E+00 .7758E+00 E+02 1633E+02 497E+02 474E+02 404E+02 331E+02 253E+02 1165E+02 1060E+02 2232E+01 1998E+01 1835E+01 1712E+01 1613E+01 1210E+01 1139E+01 8975E+00 356E+02 .8370E+01 656E+02 9132E+01 1459E+01 .1250E+01 1078E+01 1530E+01 1398E+01 343E+01 . 1294E+01 .2657E+01 381 110.000 120.000 140.000 150.000 170.000 170.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 220.000 320.000 330.000 340.000 350.000 390.000 400.000 410.000 430.000 440.000 520.000 520.000 540.000 560.000 580.000 360,000 460.000 470.000 480.000 900.00 580.000 150,000 85.878 190.000 000.00 Temp.

	Dielectric Constant	2.09193	2.08279	2 04020	2.02020	2,00024	1_98088	1.96183	10	1-92440	1 90588	1-88742	1.86895	1.85042	1.83175	00	1.79377	1.77431	1.75441	1.73398	1.71289	1.69097	1.66804	1.64380	1.61787	1.58963	1.55807	1.52120	1.4/408	1.59561	10000	1.10752	1.09758	1.09027	1.08453	1.07981	1.07583	0000000		0000000	0000000	0000000	0.0000	0.0000	0.00000	0.0000	0.0000	0.0000	
	Vel. of Sound m/s	2037	2008	1940	1813	1753	1694	1636	1578	1521	1464	1407	1351	1294	1237	1180	1123	1065	1007	948	889	829	768	902	642	576	206	430	544	211	100	206	219	230	239	248	256	263	270	276	S.	30 p	1,00%	12 t	- H	C =	7 10	0 0 0	
	Fugacity/ Pressure Ratio	.64303E-10	.30545E-09	10755E-06	-85705F-06	0 E-0	9) <u> </u>	23182F-03	59402F	13507F-0	Ċ	52608E	Ó	15367E-0	ш	.36281E-01	.52334E-01	.72871E-01	.98352E-01	,12911E+00	.16535E+00	.20709E+00	.25417E+00	.30627E+00	.36295E+00	.42363E+00	.48750E+00	.55284E+00	.61800E+00	696466+00	72178F+00	.74373E+00	.76316E+00	.78060E+00	.79632E+00	.81060E+00	0	.83554E+00	.84651E+00	.85661E+00	,80.594E+00	.88258E+00	- 4	.90944E+00	0.97036E+00	05243E+00	7:1	
	Cp J/(mol•K)	84.05	84.23	04./I	85.87	86.44	87,13	87.90	88.75	89,69	90.74	91.88	93, 15	94.56	96.11	97.83	99.72	101.83	104.18	106.79	109.74	113.07	116.90	121,37	126.74	133.46	142.47	156, 13	182.88	202 24	177 82			128.25	124.65	122.61	121.54	121.10	121.10	121.42	121.96	122.68	124.47	126.57	128.85	1510/4	141 06	145.85	\
	Cv J/(mol•K)	61.83	61.64	62.10	60.78	60,70	60.70	60,79	96"09	61.22	61.57	62.00	62.53	63.15	63.87	64.70	65.63	66.68	67.86	69, 16	70.61	72.20	73.95	75.87	77.97	80.25	82.70	85.25	8/04/	115.35	10,10	04, 20	93.76	94.60	95.71	96°98	98°36	99.81	101.31	102.84	104.39	105.95	109.08	112.20	110 20	118.29	120 71	134.99	0
₂ a	Entropy J/(mol•K)	82.611	86.681	107 990	111-449	118.323	124.721	130,727	136-404	141,801	146.960	151,914	156.690	161.311	165.797	170,165	174.429	178.601	182.692	186.713	190.675	194.591	198.476	202.347	206.228	210,147	214.152	218.331	222.908	228.519	250 852	254.868	258, 326	261.486	264.458	267,298	270.040	272.706	275,310	277.862	280.371		287,687		29/00/	501.650 210 E44	210 208	327.648	
P = 4.6 MPa	Enthalpy J/mol	280.2	654.6	7477°	3213.1	4073.2	4937.2	5807.3	6685.8	7574.7	8475.9	9391.0	10321.5		12233.4	13216.6	14219.2	15242.1	16286,1	17352.4	18442.8	19559.6	20705.8	21886.2	23107.5	24380.1	25721.1	27163.6	788887	50840°5	30067 8	40848, 5	42248.6	43559.9	44822.7	46058.0	47278.1	48490.8	49701.5	50913.9	52130.7	53353.7	55824.5	58334.5	62400 3	65489.5	74281 4)	
	Internal Energy J/mol	4.0	556°8	2068 9	2923.3	3779.3	4638.9	5504.7	6378.6	7262.7	8159.0	9068.9	9994.1	10935.5	11894.3	12871.3	13867.2	14882.8	15919.1	16977.1	18058.3	19165.0	20300.0	21467.6	22674.1	23929.1	25248.5	26662.3	28244.5	30199°5	77385 3	38716.9	39909.7	41039.8	42138.2		44297.9	45374.1	46454.1	47540.3	48634.8		51979.9	0	50008.5	9.00065	60006 7	74452.7	
Propane Isobar at	sotherm Derivative MPa·m3/kg	3.05305	2.95080	2 51701	2,33045	2,15890	1.99976	1.85112	1,71155	1.57997	1-45552	1.33756	1.22557	1,11914	1.01796	.92176	.83033	.74351	.66114	. 58311	. 50928	.43957	.37385	.31203	.25398	.19958	.14871	.10120	28960.	.01517	200000	807.00	•03349	.03912	.04420	.04886	.05321	.05729	•06116	.06485	06839	07180	•07829	.08442	970600	* UV588	166	.12638	
	lsochore Derivative MPa/K	3.107576	2.992970	2 510828	2,324081	2,148785	1,990438	1.846340	1.714367	1,592816	1.480302	1,375683	1.278006	1.186468	1,100386	1.019172	.942315	.869369	.799937	•733662	•670216	•609289	.550577	.493760	.438477	.384268	.330463	.275886	.21/840	.145055	032647	027250	.023863	.021457	.019624	.018166	.016967	.015959	.015095	.014344	.013683	.013095	.012092	.011262	196010.	. 000000	0000000	.007545	5 5 5
	7	.38674	• 57121	*330/0	29039	.27192	.25619	24267	23094	22072	21175	20386	19691	.19077	,18536	.18060	.17643	.17283	,16976	.16720	,16516	.16365	.16272	.16243	.16290	.16436	.16719	.17224	6/1810	.20850	57002	64094	.68610	.72167	.75085	.77544	.79654	.81489	.83101	.84531	.85807	.86952	.88923	.90555	27616.	18066.	06210		
	sity kg/m3	.73442E+03	.73025E+03	71010E±03	-70011F+03	.69015E+03	_68020E+03	67024F+03	66025F+03	.65020F+03	64008F+03	-62985F+03	_61950E+03	.60898E+03	.59828E+03	.58735E+03	.57615E+03	.56464E+03	.55275E+03	.54041E+03	.52755E+03	.51405E+03	.49977E+03	.48452E+03	.46801E+03	.44981E+03	.42918E+03	.40470E+03	.5/2/9E+05	.51656E+03	10801E+03	95160F+02	_86728E+02	.80491E+02	.75563E+02	.71504E+02	.68063E+02	.65085E+02	.62464E+02	.60128E+02	.58025E+02	.56115E+02	.52761E+02	.49892E+02	.4/594E+UZ	.45190E+0Z	48484F402	• 35793E+02	
	Density mol/L	.1665E+02	•1656E+02	. 1033E+UZ	1588F+02	.1565E+02			1497F+02	1474F+02	1452F+02	1428F+02		.1381E+02	•1357E+02	.1332E+02	_	.1280E+02	.1253E+02	.1226E+02	,1196E+02	.1166E+02	.1133E+02	.1099E+02	•1061E+02	.1020E+02	.9733E+01	.9177E+01	.8454E+01	./1/9E+01	2450E+01	2158F+01	. 1967E+01	.1825E+01	.1714E+01	.1622E+01	.1543E+01	.1476E+01	.1416E+01	.1364E+01	.1316E+01	. 1273E+01	.1196E+01	103512+01	10/5E+01	10/5/19/00	8704E+00	.8117E+00	
	Temp. K	85.896	90°000	140.000	120,000	130,000	140.000	150-000	160,000	170.000	180.000	190-000	200,000	210,000	220,000	230,000	240,000	250,000	260.000	270,000	280,000	290.000	300.000	310,000	320,000	330.000	340.000	350.000	560.000	3/0.000	200.000	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000	500.000	520.000	540.000	560.000	280.000	000 079	700.000	

Sound 710 646 581 522 409 352 295 182 1637 067 .74618E-08 .99618E-07 .83177E-06 .47069E+00 .50532E-01 Fugacity/ .24530E+00 48537E-05 .13064E-02 .50849E-02 .29560E+00 .59754E+00 ,73359E+00 .77217E+00 .78857E+00 .29748E-09 21423E-04 .75788E-04 .22440E-03 57476E-03 26877E-02 89582E-02 94941E-01 .12463E+00 .15959E+00 19987E+00 .35032E+00 .40893E+00 .65047E+00 .68368E+00 .71051E+00 75395E+00 .14846E-01 .23337E-01 .35037E-01 Pressure Ratio J/(moleK) 85.23 87.12 87.89 88.74 90°72 91°87 93°13 94°53 96°08 97°79 99°68 104.10 106.70 109.62 132.89 154.24 177.51 286.79 194.96 89.68 112.93 26.37 39.43 51.43 24.37 86.43 21.11 437.74 J/(mol·K) J/(mol·K) 61.84 61.65 61.26 60.97 60.79 60.70 60.71 63.88 64.70 66.69 72.21 73.96 75.88 85.19 87.30 114.36 94.23 94.95 95.99 97.21 61.23 61.58 62.01 62.54 63.16 95.12 80°24 82.67 94.06 65.64 69,17 77.97 60.97 70.61 214.047 218.187 222.675 227.819 82.613 86.664 95.782 130.708 136.384 141.780 182.657 198,424 202,288 249.527 253.870 257,485 260.739 Entropy 103.972 18.304 151.891 170.137 78.569 94.545 206,159 242.546 46.939 61.286 65,771 90,633 210,064 266,661 (Confinued) Enthalpy 292.4 645.1 1506.2 2365.1 3223.5 4083.6 4947.5 5817.5 6695.9 15249.6 16292.9 17358.5 18447.9 42002.1 43352.3 44642.1 45897.5 9400.7 11277.8 12242.2 13225.1 14227.3 19563.4 24372°2 25706°0 27135.0 28728.2 8485.7 23104.3 40538.8 50608.7 21886.1 56141.1 58824.1 = 4.8 J/mol ۵ 4.2 355.3 1212.3 2067.0 2921.2 3776.9 Energy J/mol 7259.2 Propane Isobar at 5501.8 9064.7 8155.1 2864.9 4874.9 8047.0 9152.0 21449.8 22652.8 58481.6 59723.5 13099.9 6375.4 0930.3 1888.6 3860.1 5910.2 6967.1 20284.9 23902.7 25214.3 26614.4 28165.5 29962.3 34836.6 57047.9 40883.3 12002,1 Table 21. Derivative Sotherm MPa . m3/kg 2.95305 2.51933 51275 44315 37755 31587 25799 15320 10606 06225 01659 03142 .71412 .58259 .34030 .22838 92478 83343 74669 58647 ,02184 04255 2.16131 45820 00584 03728 .85363 .12202 ,02091 66441 20381 3.05481 Derivative 1.593840 .943689 .870817 .801469 .735292 .671960 .552623 .280103 .223727 .157317 Sochore 2.520602 1.020481 387139 333848 2.993609 .496011 ,055613 3.107644 2,741385 .991348 .847288 .481366 .279155 .187666 030103 023229 .021132 2,149654 .376788 440992 036984 ,026034 MPa/K 21012 41288 54776 61855 21268 20542 19900 18026 17704 17436 17222 17062 17392 17887 18800 70704 32588 30298 28371 26729 19335 18838 18403 16927 16970 66842 25318 23027 16961 24094 .43051E+03 .85728E+02 .52794E+03 .68030E+03 64021E+03 63000E+03 61966E+03 57639E+03 56491E+03 50031E+03 .48516E+03 .46879E+03 37615E+03 32745E+03 .11917E+03 ,10289E+03 92893E+02 73031E+03 72022E+03 .71018E+03 70020E+03 69025E+03 67035E+03 66036E+03 65033E+03 60916E+03 59848E+03 58757E+03 55305E+03 54075E+03 45080E+03 16226E+03 Density 1197E+02 1167E+02 1666E+02 610E+02 543E+02 452E+02 429E+02 1405E+02 357E+02 332E+02 281E+02 1135E+02 1100E+02 1022E+02 2107E+01 633E+02 520E+02 498E+02 381E+02 307E+02 254E+02 1226E+02 1063E+02 656E+02 588E+02 565E+02 475E+02 9763E+01 9221E+01 8530E+01 3680E+0 2333E+01 7426E+0 2702E+0 mo 1/L 160.000 170.000 180.000 220.000 230.000 240.000 120.000 130.000 140.000 190.000 150,000 250.000 85,915 90.000 10.000 210.000 270,000 280,000 000.00

.71350

.61906

.59114 56006 .52406 .47897 . 18904 ,13616 .10481 .08987

.40892

.11666

.09637

.08461 .08021

.80346E+00

22,94

98.55 99.98

269,438

272,131

47133.3

14188.2

45273.7 46361.3 17453.9

01.45 102.97

274.758 279.854 282.338

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49579.8

82943E+00 ,84084E+00

122.25

.81701E+00

64478

98899

.83207

,85071

.77474

.75489 .73452

.79416

.88766 .86922

90611

Dielectric Constant

2.06128

2,02015 .98104 .94321 .92460

2.00039

.96200

0000000

.85135E+00

122.67 123.30 124.96

104.50 09.16

87835E+00 .89330E+00 91761E+00

0.00000

00000°C 00000°C 0000000 .93631E+00 .95091E+00 .96248E+00

136.37

24.18 29.74 35.02

310.119 318.796 327.245

58781.9

4415.6 53897.3 59055.1

007917

63424.3 4334.0

115.33

501,189

291.958 296.615

55737.0 58255.9 60817.3

53255.2

48553.8 49662.6

51911.4 54206.4 56551.2 58947.6

52025.4

50801.1

287,205

0000000

0000000

90626E+00

26.97 29,19 (Continued)

Table 21.

	Dielectric Constant	2.09213 2.08313 2.06152 2.04067	2.02043	1.98137	1.96250	1.92502	1.90655	1.86975	1.85128	1.81394	1.79493	1.77559	1.73560	1.71472	1.69309	1.64672	1.62141	1.59406	1.52942	1.48762	1 20756	1.17155	1.13810	1.10962	1,10128	1.09473	00000000	0.00000	000000	00000000	000000	000000	0000000	000000	00000
	Vel. of Sound m/s	2038 2009 1942 1877	1815	1696	1581	1524	1467	1355	1298	1185	1128	1071	955	897	838	717	654	590	452	375	267	174	193	221	231	241	258	265	212	284	296	306 315	324	340	369
	Fugacity/ Pressure Ratio	.61166E-10 .28361E-09 .70937E-08	.78742E-06 .45875E-05	20221E	21134F-03	1 1 1 1	.12283E~02	.47748E-02	.84073E-02	-15926E-UI	.32841E-01	.47350E-01	.52902E-01	.11670E+00	.14942E+00	.22965E+00	.27674E+00	.32800E+00	.44098E+00	.50064E+00	.56109E+00	.65760E+00	.68789E+00	.73562E+00	.75543E+00	.77321E+00	.80393E+00	.81733E+00	8290ZE+00	.85138E+00	.87000E+00	-8860/E+00	.91219E+00		.96036E+00
	Cp J/(mol•K)	84.04 84.22 84.70 85.22	85.79	87.11	88,77			0		96.01	- m		105.95			120.61	125,66	131,84	150.97	169.27	240.53	259.36	177,38	138.77	132,10	128.23	124.70	124.10	127.16	124.60	125,98	127.80	132.11	136.81	146.26
	Cv J/(mol•K)	61.86 61.67 61.27 60.99	60.81	60.72	00°81	61.24	61.59	62.55	63,17	65.89	65.65	66.70	69°18	70.63	72.22	75.88	77.96	80.22	85.08	87.02	113,32	97.63	95.49	95.68	96.56	97.68	100,31	101 074	103.22	106.25	109.32	112,40	4		135.07
ro	Entropy J/(mol•K)	82.618 86.630 95.748	111,395	124.664	136.343	141.738	146.895	156.618	161.236	165./18	174,339	178,505	186.588	190°251	194.454	198.522	206.023	209.902	217.915	222,258	226.868	246.454	251.750	259.237	262,417	265.406	271.013	273.688	2/0°298 278 856	100	286.280	291.068	\ 	000	326.481
P = 5.2 MPa	Enthalpy J/mol	316.8 666.3 1527.3 2386.1	5244.4	4968,1	5858 0	7604.7	8505.4	10349.9	11296.2	12260.0	14243.5	15264.8	17370.8	18458.2	19571 . 1	20/12.5	23098.5	24357.8	27083.2	28624.5	30309.3	37759.2	39849.4	47915.0	44266.3	45566.2	48088.6	49332.2	51812.5	53056.1	55560.9	58098.2	63294.3	67	79996.7
sobar at	Internal Energy J/mol	4.6 352.4 1209.0 2063.3	2917.0	4631.1	5496°0 6369.0	7252.2	8147.4	0.0866	10920°0	1787/01	13846.0	14859.2	15892.6	18024.5	19126.2	21414.9	22611.0	23851.3	26524.3	28024.4	29638.8	36212.2	37951.7	40551.4	41717.1	42848.5	45067.8	46171.7	4 1211 ey	49508.1		54081.0		 ← C	74341.5
Propane 1s	lsotherm Derivative MPa·m3/kg	3.05834 2.95756 2.72898 2.52398	2,33754	0	1.85864	1,58783	1.46356	1.23399	1.12777	1.026/9	.83962	.75304	. 59317	.51965	.45026	.32351	.26595	.21215	.11552	.07265	.03379	.01145	.02012	03370	.03933	.04446	.05363	.05781	.06556	.06918	•07606	.08251	.09450	10558	.12600
	lsochore Derivative MPa/K	3.107782 2.994887 2.742814 2.522151	2,326556	1.993166	1.849183	1.595886	1.483489	1.281448	1,190053	1.104128	.946425	.873699	.738531	,675422	.614896	.500450	.445932	• 392744	.288108	.234423	.175540	.048647	.036931	.027162	.024420	.022324	.019276	.018118	016265	.015506	.014228	.015186	.011575	.010373	.008669
	2	.43681 .41951 .38285 .35295	.32815	.28948	26003	,24936	.23922	.22242	.21546	.20935	.19920	.19510	. 19159	.18629	. 18452	.18250	.18325	.18460	.19207	.20050	21795	.47707	.57060	67687	.71302	.74286	.78982	.80876	. 82.24.5 . RA.02.3	.85346	.87610	.91028	.92341	.94422	.97165
	sity kg/m3	.73456E+03 .73045E+03 .72036E+03 .71034E+03	.70037E+03	.68050E+03	.67056E+03	.65058E+03	.64049E+03	•61998E+03	.60952E+03	. 59887E+03	.57687E+03	.56544E+03	.55565E+05	.52872E+03	.51540E+03	.50155E+05 .48641E+03	.47032E+03	.45273E+03	.41024E+03	.38208E+03	.34200E+03	.14823E+03	. 12083E+03	.97011E+02	.89952E+02	.84376E+02	• 75909E+02	.72554E+02	.66986F+02	•64628E+02	.60537E+02	.5/081E+02 .54102E+02	.51494E+02	.47110E+02	.40548E+02
	Density mol/L	.1666E+02 .1656E+02 .1634E+02 .1611E+02	hom bear	.1543E+02	.1521E+02	• 1475E+02	.1452E+02	• 1429c 102	4	. 1358E+02	.1308E+02	.1282E+02	. 1256E+02	- dimmi	.1169E+02	.115/E+02 .1103E+02	.1067E+02	.1027E+02	. 9303E+01	.8665E+01	•7756E+01	.3361E+01	.2740E+01	.2200E+01	.2040E+01	*1913E+01	.1721E+01	• 1645E+01	1519F±01	.1466E+01	•1373E+01	. 1294E+01	.1168E+01	• 1068E+01	.9195E+00
	Temp.	85.952 90.000 100.000	120.000	140,000	150.000	170.000	180.000	0 0	210,000	220,000	240.000	250,000	270,000	280.000	290.000	310.000	320.000	330,000	350,000	360,000	370°000	390.000	400.000	410.000	430.000	440.000	460,000	470.000	490-000	500.000	520,000	560,000	580,000	620.000	700.000

	Dielectric Constant	2.09222	2.06170 2.04086	2.02064	1.98161	1.96262	1.94388	1.92532	1 888 F1	1.87014		1.83317	1.81446	1.77623	1.75656	1.73639	1.71563	1.69412	1.67170	1 62412	1.59618	1.56661	1.53316	1.49337	1.34846	088	1.15775	1,13476	1.12058	1.1022	1.09660	0000000	0	0.00000	0.0000	000000	0.0000	00000	0.00000	0.00000	0.00000	0.00000
	Vel. of Sound m/s	2039	1943	1817	1698	1640	1582	1526	1409	1357	1300	1244	1187	1074	1016	959	006	842	782	77/	597	531	463	389	288	171	187	203	216	220	247	255	265	270	012	100	100	, to	575	340	3.55	00/
	Fugacity/ Pressure Ratio	.59964E-10	.68565E-08	.75870E-06		.68629E-04	.20284E-03	.51874E-03	2410/4E-02	•45726E-02	ш	.13327E-01	.20933E-01	.45274E-01	3003	.84989E-01	•11153E+00	*14279E+00	.17879E+00	264425100	للا إ	.36601E+00	.42156E+00	.47881E+00	53712E+00	3758E	.67083E+00	.69822E+00	•72197E+00	76180F±00	.77880E+00	.79424E+00	2	.82132E+00	.85524E+00	00+1+7++00	86582E+00	001787888	2 9	.92930E+00	· 94577F#00	.95882E+00
	Cp J/(mol·K)	84.04	84.69 85.21	85.78	87,10	87.86	7.	89.63	90.00	93.05	94.43	95.96	97.65	101.57	0	0	st.		116.07	٠ ، ،	131,10	138.63	148.87	164.56	223.06	- M	199.76	161.84	145.25	131 44	128.44	9.	125.73	5. L	125.55	10.07	128.13	140 40	132.50	137.14	141.83	146.47
	Cv J/(mol•K)	61.87	61.29	60.82	60.73	60.82	61.00	3,	01.00	62.56	63.19	63.91	64.73	5 ~	67.89	69.19	70.63	72.22	73.97	77.06	80.20	82.59	85.01	86.86	112.86	99.37	96.61	95.96	96.25	00 00	99.24	100.56	101.96	103.41	104.89	04.00	112 50	115 50	0 0	124.31	129.84	155.10
O	Entropy J/(mol•K)	82.621 86.605	95.722	111.368	124.636	130.639	N	141.707	140.802	156.582	161,198	165.678	170.039	178.457	182,536	186.544	190.490	194.386	198.246	205 000	209.784	213.699	217.724	221.978	226.339	243,735	250.026	254.419	258.097	754.02	267.395	270.197	272.910	275.552	2/8.156	200.000	285.617	751 700	299.750	308.740	317.459	525.940
- 5.5 MPa	Enthalpy J/mol	335.0 682.1	1543.1	3260.1	4117.9	5853.3	6731.3	7619.7	2.0208 0.44 F		11310.0	12273.4	13255.1	15276.2	16317.3	17380.1	18466.1	19577.2	20716.1	23000	24348.0	25658.9	27048.5	28558.3	30151.8	36780.3	39262.5	41040.8	42566.6	45308 A	6606.	47881.2	49142.7	50397.6	51650./	7.500.5	55421.9	A LARON A	63196.7	68589.8	74169.2	79955.6
sobar at	Internal Energy J/mol	4.9	1206.5	2913.8	4627.2	5491.7	6364.3	7247.0	00141.0	9973.0	10912.3	11868.6	12842.8	14847.5	15879.6	16932.6	18007.8	19107.2	20233.1	22580 3	23814.0	25101.2	26460.9	27930.0	29458.7	35418.6	37492.6	38987.0	40284.4	47651.7	43786.8	44908.9	46026.1	47143.2	48265°9	49090 00	51668°5	100000 100000 100000	58761.2	63735.1	68911.2	/4286.1
Propane 13	Isotherm Derivative MPa·m3/kg	3.06099	2.73240 2.52746	2.34109	2.01081	1.86240	1.72308	1.59175	1 240/2/	1.23819	1.13207	1.03120	.93533	.75779	.67580	.59818	.52480	.45557	.39039	0167C	.21832	.16852	.12243	.08012	.04202	90600*	.01709	.02457	.03113	00700	.04726	.05186	.05618	06027	.0641/	10000	08158	00 - 00 · 00 · 00 · 00 · 00 · 00 · 00 ·	.09383	. 10511	. 11572	C2C71•
	Isochore Derivative MPa/K	3.107889	2.523312	2.327792	1.994528	1.850603	1.718798	1.597417	1 2806/13	1.283163	1,191839	1.105991	1.025036	875848	.806788	.740942	966219°	.617661	.559662	07/00/	.396837	.345123	.293787	.241717	.186415	.061198	.043315	.035331	.030500	024647	.022681	.021084	.019752	.018620	016796	0010100	.012555	012020	.012413	.011096	.010070	. UUY245
	7	.46182	.40487	.34702	.30612	.28994	.27591	.26367	* 25294	.23516	.22779	.22130	.21557	20621	.20248	.19935	.19683	. 19491	. 19364	10226	. 19465	.19729	.20191	.20991	.22529	.41994	.53218	.60245	.65352	72620	.75365	.77715	.79755	.81545	05150	44040	86998	00.000	.91978	.94176	.95816	/90/6*
	ity kg/m3	.73463E+03	.72047E+03	. 70050E+03	.68065F+03	.67072E+03	.66077E+03	.65077E+03	.04009E+05	.62023E+03	.60978E+03	.59916E+03	• 58832E+03	.56584E+03	.55409E+03	.54194E+03	.52929E+03	.51606E+03	.50213E+03	4407JULTOJ	.45412E+03	.43486E+03	.41276E+03	.38601E+03	.34993E+03	.17811E+03	• 13703E+03	.11810E+03	•10628E+03	91291F±02	.86011E+02	.81597E+02	.77819E+02	•74525E+02	60005E+02	20700000	.64510E+02	57502E402	.54680E+02	.49958E+02	•46127E+02	,4795111402
	Density mol/L	.1666E+02	.1634E+02	.1589E+02	1544F+02	.1521E+02	.1498E+02	.1476E+02	1435E+02	. 1406E+02	.1383E+02	•1359E+02	•1334E+02	1283F+02	•1257E+02	.1229E+02	.1200E+02	•1170E+02	• 1139E+02	1069F±02	• 1030E+02	.9861E+01	.9360E+01	.8754E+01	.7936E+01	.4039E+01	.3108E+01	.2678E+01	.2410E+01	2070F+01	. 1950E+01	.1850E+01	.1765E+01	.1690E+01	1624E+01	* 100001	. 1465E+UI	13075+01	.1240E+01	.1133E+01	. 1046E+01	.9/35E+00
	Temp.	85,980	100,000	120,000	140-000	150.000	160.000	170.000	180,000	200,000	210.000	220.000	230.000	250.000	260,000	270.000	280,000	290.000	300.000	320.000	330.000	340,000	350.000	360.000	370,000	390.000	400.000	410.000	420.000	420.000	450.000	460.000	470.000	480.000	490.000	0000	520.000	560 000	580.000	620.000	660.000	000°00/

Table 21. (Continued) Propane Isobar at P = 6.0 MPa

Dielectric Constant	2.09239 2.08357 2.06200 2.04119 2.02099	1,98202 1,96306 1,94435 1,92583 1,90744 1,88911	1.85243 1.85395 1.79644 1.77727 1.75771 1.71712	1.67368 1.65046 1.62590 1.57095 1.57898 1.53898 1.45576	1.27890 1.19870 1.16179 1.12741 1.1732 1.10943 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000	
Vei. of Sound m/s	2040 2012 1944 1880 1818	1700 1642 1585 1472 1416	1504 11248 1135 1078 1021 964 907	790 730 607 608 744 747 747 747	222 233 242 259 259 266 273 280 292 293 303 313	339 355 369
Fugacity/ Pressure Ratio	.58387E-10 .26218E-09 .65208E-08 .86457E-07 .71776E-06	.18323E-04 .64590E-04 .19066E-03 .48704E-03 .11044E-02 .22675E-02	.75518E-02 .12464E-01 .19568E-01 .29347E-01 .42286E-01 .58825E-01 .79331E-01 .10408E+00	.16680E+00 .20469E+00 .24668E+00 .29243E+00 .34156E+00 .39355E+00 .44730E+00 .50240E+00	60420E+00 64229E+00 69936E+00 72243E+00 74298E+00 76151E+00 77830E+00 77830E+00 80767E+00 82059E+00 82059E+00 82059E+00 82059E+00 83249E+00 83249E+00	.92447E+00 .94226E+00 .95633E+00
Cp J/(mol•K)	84.03 84.68 85.20 85.77		94.37 95.88 97.59 101.43 103.69 106.19	115.64 119.68 124.37 129.97 136.88 145.88 158.46 205.55	455747554556450=	137.70 142.27 146.83
CV J/(mol•K)	61.89 61.70 61.31 61.02 60.84	60.75 60.84 61.02 61.28 61.62 62.06	63.20 63.92 64.75 65.68 65.13 67.91 70.65	73.98 75.88 77.95 80.18 82.54 84.91 86.65	98.29 97.22 97.19 97.74 98.63 99.74 100.98 105.17 105.17 106.65 112.66	124.40 129.92 135.16
Entropy J/(mol•K)	2.62 6.56 5.68 7.86 1.32 1.32	124 .589 130 .591 136 .263 141 .655 146 .808 151 .755	161.156 165.613 169.969 174.220 178.377 182.451 190.389 194.275	198.122 201.946 205.762 209.593 213.466 217.426 221.559 225.636	259.553 246.921 252.082 256.161 259.708 265.980 265.980 271.653 274.551 279.554 284.562 284.562 289.422	307.840 316.590 325.094
Enthalpy J/mol	365.5 708.5 1569.4 2428.1 3286.2	5009.4 5878.9 6756.6 7644.7 8544.8 9458.7	1533.1 12295.7 13276.5 14276.1 15295.3 16334.9 17395.8	20722.7 21888.5 23089.8 24333.6 25630.4 26997.1 289464.1 29955.7	25249.4 38164.2 40254.2 41946.2 43453.5 44861.5 46211.6 47526.4 47526.4 50101.6 51376.9 52650.5 55204.4 60388.1	68453.2 74052.4 79834.5
Internal Energy J/mol	5.4 346.5 1202.3 2055.8 2908.6 3762.9	4620.8 5484.6 6356.4 7238.3 8132.1 9039.3	10899.5 11854.5 12827.2 13818.2 14828.3 15858.0 16908.3 17980.4	20197.1 21347.2 22530.7 23753.8 25026.0 26362.1 27788.9	3411009 3661009 3886906 3980300 4109201 4230706 4463503 4577607 4691306 4919102 5382608	63619.1 68808.6 74194.0
Isotherm Derivative MPa•m3/kq	3.06541 2.96656 2.73811 2.53326 2.34699 2.17574	2.01694 1.86866 1.72947 1.59828 1.47425 1.35672	1.15922 1.03852 .94283 .76567 .68389 .60648 .53334	.39946 .33855 .28157 .22844 .17913 .13362 .09205	01027 01374 02060 02728 03340 04419 05356 05786 06194 06194 06194	.11524
lsochore Derivative MPa/K	3.108071 2.997447 2.745672 2.525247 2.329852 2.154863	1.996797 1.852965 1.721253 1.599964 1.487721 1.383386	1.194804 1.109082 1.028267 .951854 .879409 .810547 .682243	.564583 .509090 .455479 .403465 .352705 .252835 .201649	087454 057044 044058 032275 028929 026374 020072 01934 017314 017314 015855	.012332 .011158 .010217
2	.50345 .48387 .44157 .57845 .35435	.33882 .31617 .30086 .28750 .27579 .26547	.24832 .24122 .23496 .22947 .22469 .22059 .21714	.21072 .21000 .21013 .21130 .21381 .21821 .22559 .225670		.93776 .95557 .96912
11ty kg/m3	.73474E+03 .73072E+03 .72066E+03 .71066E+03 .70071E+03	.68090E+03 .67099E+03 .66106E+03 .65108E+03 .64103E+03 .63089E+03	.61022E+03 .59964E+03 .5782E+03 .57782E+03 .56649E+03 .554277E+03 .53024E+03	.50340E+03 .48883E+03 .47524E+03 .4556E+03 .41667E+03 .31357E+03	23240E+03 17012E+03 14039E+03 12345E+03 11205E+03 10360E+03 96955E+02 96955E+02 86955E+02 86955E+02 77483E+02 77483E+02 66924E+02 66924E+02	.54732E+02 .50457E+02 .46908E+02
Density mol/L	.1666E+02 .1657E+02 .1634E+02 .1612E+02 .1589E+02	544E+02 522E+02 499E+02 476E+02 454E+02 431E+02		1142E+02 1109E+02 1073E+02 1035E+02 9927E+01 9449E+01 8886E+01 8171E+01	25270E+01 3184E+01 2860E+01 2249E+01 2349E+01 2199E+01 1971E+01 1882E+01 1882E+01 1734E+01 1518E+01 1434E+01	.1241E+01 .1144E+01 .1064E+01
Temp. *				300,000 310,000 320,000 340,000 350,000 350,000 360,000	390.000 400.000 420.000 430.000 440.000 460.000 480.000 520.000 540.000 580.000	

	Dielectric Constant	2.09255	2.06230	2.02134	2.00168	1.98242	1.96550	1.92634	1.90799	1.88971	1.87144	1.85515	1.81616	1.79738	1.77831	1.75888	1.73901	1.71859	1.67561	1.65272	1.62858	1.60286	1.57504	1.50942	1.46765	1.41300	1.33222	1.245/5	1 - 16483	1.14631	1.13322	1,7521	00000	0000000	0000000	0000000	0.0000	0,0000	0000000	0.00000	0000000	0.00000
Vel	Sound m/s	2041	1946	1820	1760	1702	1507	1531	1475	1419	1363	1251	1195	1139	1083	1026	9/0	915 855	797	738	619	619	757	404	340	279	213	191	206	218	228	277	256	263	271	277	290	312	321	339	354	569
Fugacity/		.57245E-10	.62448E-08	.82560E-07	.39629E-05	.17390E-04	18046E-03	ᅵᄔ	. 10431E-02	.21399E-02	.40381E-02	./09//E-02 11730E-01	. 18420E-01	.27613E-01	.39771E-01	.55306E-01	• /4564E-01	12517F±01	. 15669E+00	.19228E+00	.23172E+00	.27472E+00	. 52094E+00	42067F+00	.47296E+00	.52471E+00	.57290E+00	6141/E+00	.67703E+00	.70216E+00	.72445E+00	- /4448E+UU	.77914E+00	.79426E+00	.80818E+00	.82098E+00	.84376E+00	88044E+00	9529	.91976E+00	3884	.95394E+00
	Cp J/(mol•K)	84.03	84.68	85.75	86.37	87.06	8/°81	89, 57	90.58	91.70	92.94	94.50	97.46	99.28	101.29	103.52	105.98	1111 79	115.23	119.14	123.65	128,94	155.54	153.81	194.75	215.08	283.51	261.15	172,22	154.27	144.08	15/093	131,77	130.34	129.57	129,25	129.56	132,23	134.09		142.71	14/•18
	Cv J/(mot•K)	61.91	61.33	60 .86	60.77	60.77	60.86	61,29	61.64	62.08	62.60	65.22	64.77	65.70	66.75	67.92	59.25	70.07	73.99	75.89	77.95	80, 16	82.50	86.49	112.02	99.25	99.42	99.15	98.07	98.45	99.22	100.73	102.68	104.04	105.45	00	109.85	115.00	118.75	124.49	129.99	155.22
o o	Entropy J/(mol•K)	82.632	95.637	111,279	118.148	124.542	150.542	141.603	146.754	151,699	156,464	161.074	169,900	174.147	178.299	182.366	186.560	190.289	198.000	201.808	205,605	209.410	215.245	221, 148	225.067	230,357	236.786	245.922	254.188	258.009	261.429	267 595	270.438	273, 195	275.874	278.488	283.560	4 (297,919	306.997	315.779	524.506
	Enthalpy J/mol	395.9	1595.8	2454.5	4171.8	5035.1	5904.5	7,669.7	8569.5	9482.9	10411.5	11556.2	13298.0	14296.6	15314.6	16352.6	1/411.7	18495.0	20729.9	21891.0	23086.0	24321.2	25605.4	28385.3	29803.7	31788.6	34265.3	3/085.0	41283.8	42907.2	44394.5	47002.2	48489.6	49799.5	51098.6	52392.3	54978.8	50208.4	0 0	68317.0	73936.3	19154.2
internal	Energy J/mol	5.9	1198.1	2903.4	3757.0	4614.3	54//•5	7229.7	8122.6	9028.9	9949.9	11840 5	12811.7	13801.1	14809.2	15836.7	10884 . 4	10045 2	20161.9	21306.4	22482.6	23696.0	24954.7	207707	29025.9	30921.4	33212.6	52698.9	39278.2	40663.9	41943.4	45164.0	45519.1	46677.5	47832.4	48987.9	51312.0	56057.5	0 0	63502.9	68706.2	74102.5
Isotherm	Derivative MPa·m3/kg	5.06983	2.74382	2,35289	2,18175	2.02306	1.8/491	1.60480	1.48091	1.36354	1.25215	1.14655	.95031	.85959	.77352	.69194	.614/4	.54181	40844	.34782	.29116	.23839	18949	10348	.06687	.03594	01600	01595	.02431	.03037	.03608	04142	.05113	.05560	.05984	06290	.07153	08535	.09171	.10365	.11478	CCC71.
Isochore	Derivative MPa/K	3,108258	2.747459	2,527182	2,157030	1.999062	1.855524	1.602506	1.490356	1.386120	1.288852	1 112150	1.031479	.955218	.882943	.814272	. /488 / 1	• 6864 <i>5</i> 8	. 569418	.514342	.461242	.409871	• 559954	.262952	.214603	.164729	.112681	0.14150	.044590	.038200	.033774	010700	.025848	.024131	.022680	.021432	.019387	016453	.015352	.013607	.012274	•011215
	7	.54503 52408	47825	.40986	.38375	.36151	22570	51131	.29861	.28743	.27755	26882	25431	.24834	.24314	•23866	.25489	220179	.22771	.22682	.22681	.22784	.25020	.245/	.25282	.27450	.32464	.41019	.57430	.62747	.67001	11001°	.76015	.78227	.80170	.31893	.84810	89149	.90797	.93388	.95308	99/96
	sity kg/m3	.73486E+03	.72084E+03	./1086E+05 .70093E+03	.69103E+03	.68115E+03	.6/126E+U5	.65139F+03	.64137E+03	.63126E+03	.62103E+03	.61066E+03	.58938E+03	.57840E+03	.56714E+03	.55556E+03	• 54559E+05	.5511/E+05 51822E+03	. 50463E+03	.49028E+03	.47499E+03	.45850E+03	.44045E+05	.4202/E+05 .39695F+03	.36854E+03	.33049E+03	.27229E+03	• 20 / 08E + 05	. 14292E+03	.12777E+03	.11694E+03	10200E+03	.96492E+02	.91810E+02	.87757E+02	.84193E+02	.78170E+02	69053F+02	.65462E+02	.59540E+02	. 54804E+02	• 50894E+0Z
	Density mol/L	.1666E+02	.1635E+02	.1612E+02 .1590E+02	_	• 1545E+02	• 1522E+02	1477F+02	• 1454E+02	-	• 1408E+02	.1585E+02 1761E±02	1337E+02	.1312E+02	• 1286E+02	.1260E+02	• 1255E+02	. 1205E+02 1175E+02	•1144E+02	.1112E+02	.1077E+02	.1040E+02	.9988E+01	.9002F+01	.8357E+01	.7495E+01	.6175E+01	.4696E+01	.3241E+01	.2897E+01	.2652E+01	02404E+01	.2188E+01	.2082E+01	.1990E+01	• 1909E+01	.1773E+01	1566F+01	.1484E+01	.1350E+01	.1243E+01	•1154E+01
	Temp.	86.072	100.000	120.000	130,000	140.000	150.000	170.000	180,000	190.000	200,000	220,000	230.000	240.000	250.000	260,000	2/0.000	280.000	300,000	310,000	320,000	330,000	340.000	360.000	370,000	380,000	390.000	400.000	420,000	430.000	440.000	450.000	470.000	480.000	490.000	500.000	520.000	560,000	580,000	620,000	660.000	000.007

Table 21. (Continued) Propane Isobar at P = 7.0 MPa

	Dielectric	2.09271	2.06260	2.04183	2.02169	2.00205	1.98285	1 04 5 2 0	1.94550	1 000 54	1 90024	1.87209	1.85384	1.83550	1.81701	1.79831	1.77934	1.76003	1.74029	1.72003	1.69914	1.67750	1.65491	1.63118	1.000399	1 5/03/	1.51619	1.47765	1,43009	1.36651	1.28884	1 10131	1,16720	1, 15053	1.13815	0000000	0.0000	00000	00000	0-0000	0000000	0000000	0000000	0.00000	0.00000	0.00000
Velant	Sound m/s	2042	1947	1884	1822	1762	1/04	1500	1530	1222	1477	1366	1311	1255	1199	1143	1088	1031	975	918	862	804	747	688	679	508	446	362	306	244	207	206	215	225	235	244	255	107	275	288	300	310	320	338	354	202
Funacîtv/		.56456E-10	*24339E=09	79307E	.65526E-06	.37901E-05	.16605E-04	23257E-04		045/94 E-US	771175	38305F-02	67284F-02	.11121E-01	.17442E-01	.26134E-01	.37627E-01	.52307E-01	.70500E-01	.92448E-01	•11829E+00	.14807E+00	.18168E+00	.21894E+00	20222E400	30332E+00	39790F+00	44772	.49743E+00	.54481E+00	.58746E+00	65512F400	.68225E+00	.70625E+00	.72776E+00	.74720E+00	./6490E+00	30500E+00	8 0968 E +00	83402F+00	.85502E+00	.87318E+00	.88904E+00	.91516E+00	.93552E+00	•9516ZE+00
	Cp J/(mol•K)	84.02	B 4	18	74)4	000	20.88	30.00	90.04	00.00		95.73				103.36	105.79	108,48		114.84		122,97	128.01	171 24	150.12	187.27	195.89	236.98	254.09	185 58	164.02	151,14		138.26		121 08	131.20	131.04	131.83	133,18	134.88	138.85	143.15	\circ
	Cv J/(mol•K)	61.93	61,35	61.07	60.88	60°79	60°79	60°88	01.02	10.10	62 10	62.62	63,24	65,96	64.79	65.72	66.77	67.94	69.24	70.68	72.26	74.00	75.89	77.94	80.15	04.70 77 Ag	86.37	1111.77	98.75	98.63	99.15	000 04	99.10	99.77	100.70	101.80	105.05	104.55	102.72	110.04	112,99	115.94	118.87	124.58	130.07	155.43
m	Entropy J/(mol•K)	.63	95,595	103.781	111.234	118,103	124.495	150.494	156,162	141.551	160./00	156 406	161-012	165.482	169.832	174.074	178,221	182,283	186.269	190.191	194.057	197.881	201.674	205.452	209.252	216 924	220.845	224.583	229.550	235,119	241.513	247.370	256.318	259,929	265,231	266,321	269.25/	2/74 900	274.600	282-604	287,561	292.379	297.081	306,204	315.017	
0°/ =	Enthalpy J/mol	426.4	1622.1	2480.5	3338.4	4197.8	5060.9	5950.1	580/03	/694°/	0.004 0.000	10435 2	11379.4	12340.6	13319 _e 6	14317.2	15333.9	16370.5	17427.8	18507.0	19609.5	20737.7	21894.3	23083.5	24510.7	25202.0	28318.2	29683.8	31547.2	33692.3	36218.1	20,000	42342.1	43912.5	45381.4	46787.0	48152.5	49492°4	50121	54751.6	57379.1	60028.4	62708.6	68181.3	73820.8	1,4004.1
Sobar at F	Energy J/mol	6.4	1194.0	2046.4	2898.2	3751.3	4607.9	54/0.4	6540.8	1.7.7.1	0010°	9010	10874.2	11826.6	12796.4	13784.1	14790.3	15815.6	16860.8	17926.8	19015.1	20127.5	21266.6	22435.9	25640.4	24,000 •0	27549.5	28861.6	30646.1	32654.2	34932.1	28725 O	40212.0	41561.5	42832.2	44056.6	272	404004	4/609.3	51130.2	53503.0	55910.0	58357.5	63386.6	68603.9	/4010•0
Propane 1:	Derivative MPa·m3/kg	3.07425	2,74953	2,54485	2,35878	2,18775	2.02918	1.88115	1./4223	1.61151	1.48/5/	1 25010	1 15347	1,05310	92176	.86722	.78133	*69994	•62294	.55024	.48173	.41733	.35698	.30062	24818	15506	11451	.07834	.04748	002484	.01677	02265	.02816	.03371	•03906	.04414	.04897	CCCCC.	06210	06997	.07730	.08420	.09074	•10298	13513	71671.
0000	Derivative MPa/K	3,108451	5.U0U654 2.749246	2.529117	2.333969	2,159195	2.001325	1.85/6/8	1.726147	1.605041	1 20004	1 201680	1.200697	1.115220	1.034674	.958560	.886450	.817965	.752775	*690585	。631131	.574173	.519488	•466861	.415078	2100012	272294	.226049	.179694	.132925	.092115	052500	.044990	.039227	.035045	.031844	.029299	017/70	0.02986	021575	.019691	.018169	.016907	.014923	.013419	1077100
	7	.58655	51490	,47466	•44125	.41313	.38918	.5685/	.35070	.55510	141700	00820	78080	78097	_27363	.26718	.26155	.25669	°25258	°24919	.24654	.24464	.24356	.24339	124421	25040	.25683	.26726	.28521	.32015	.38668	640040	.59580	.64265	.68132	• 71389	. 141/8	160010	80502	83760	.86330	.88451	.90227	.93011	69263	070060
	11+y kg/m3	.73497E+03	./5106E+03	.71105E+03	.70114E+03	.69126E+03	•68139E+03	.67153E+03	.66164E+03	.65170E+03	.641/1E+US	.0210214U3 62147E403	61110E+03	.60060F+03	.58991E+03	.57898E+03	.56779E+03	.55627E+03	.54439E+03	.53208E+03	.51926E+03	.50584E+03	.49170E+03	.47668E+03	.46056E+05	.44JUZETUJ	.40154F+03	.37544E+03	.34255E+03	.29734E+03	.24003E+03	164175403	. 14491E+03	.13129E+03	.12109E+03	.11305E+03	. 10549E+05	062525±02	90232E+02	85238F+02	.79638E+02	.74952E+02	.70943E+02	.64380E+02	.59169E+02	• 2400 / LTUZ
	Density mol/L	.1667E+02	.1658E+02	,1612E+02	.1590E+02	.1568E+02	.1545E+02	.1523E+02	• 1500E+02	.1478E+02	1455E+02	1402E+UZ	1 3865402	1362F+02		-	。1288E+02	.1261E+02	.1235E+02	•1207E+02	•1178E+02	.1147E+02	•1115E+02	.1081E+02	10055102	. 1003E+02	9106F+01	.8514E+01	.7768E+01	.6743E+01	.5443E+01	*440JE+01	.3286E+01	.2977E+01	.2746E+01	.2564E+01	.2415E+01	2107E+01	2080F+01	1933F+01	.1806E+01	.1700E+01	.1609E+01	.1460E+01	.1542E+01	• 1247LT01
	Temp.		90.000	110,000			140.000	150.000	160.000	170.000	180,000	300 000	210 000	220-000		_	250,000	260,000	270,000							240.000					400.000					460.000	4 /0.000	460.000					580,000	620.000	200.000	000000

	Dielectric Constant	2.09288 2.08439 2.06290 2.04216 2.02204 2.0024	1.96437 1.94576 1.92736 1.90909 1.89090	1.85454 1.83626 1.81785 1.78036	1.72145 1.72145 1.70075 1.67935	1.63370 1.60901 1.58262 1.55401 1.41635 1.41635	1,52413 1,52413 1,21927 1,18969 1,15402 0,00000 0,00000	0.00000 0.00000 0.00000 0.00000 0.00000 0.00000
	Vel. of Sound m/s	2043 2016 1949 1885 1824 1764	1592 1592 1480 1425 1369	1314 1259 1203 1148 1092	980 924 868 811 754	697 639 580 521 462 330	227 227 228 228 242 242 253 250 250	286 287 287 287 287 287 287 287 287
	Fugacity/ Pressure Ratio	.55958E-10 .23670E-09 .58252E-08 .76572E-07 .63116E-06 .36433E-05	. 155919E-04 . 16443E-03 . 41865E-03 . 94652E-03 . 19384E-02	. 64109E-02 . 10590E-01 . 16601E-01 . 24862E-01 . 35780E-01	.66997E-01 .8783E-01 .11237E+00 .14063E+00	.20793E+00 .24654E+00 .28811E+00 .35227E+00 .37821E+00 .42586E+00 .47369E+00		.78403E+00 .79858E+00 .82446E+00 .84677E+00 .86606E+00 .91065E+00 .91065E+00
	Cp J/(mol•K)		88.59 88.59 89.50 90.51 91.61					133.52 133.52 133.02 134.02 135.65 135.65 143.65 143.65 143.65
	Cv J/(mol•K)	61.95 61.77 61.37 60.90 60.81	60.90 61.07 61.33 61.68 62.11	63.26 63.98 64.81 65.74 66.79	69.26 70.70 72.28 74.01	77.94 80.14 82.44 84.71 86.26 111.58 98.41	99.64 99.64 100.26 101.13 102.18	105.98 107.37 115.15 116.08 118.99 124.68 135.14
ū	Entropy J/(mol•K)	82.644 86.439 95.553 103.737 111.190 118.057	130.446 136.113 141.500 146.647 151.587	160.951 165.418 169.763 174.002 178.144	186.180 190.094 193.951 197.763 201.543	205.304 209.061 212.832 216.641 220.533 224.158 228.906	259,689 245,378 254,668 258,458 261,897 265,092 268,110 270,996	273.779 276.479 281.686 281.595 291.551 296.284 305.453 314.298
P = 7.5 MPa	Enthalpy J/mol	456.8 787.8 1648.5 2506.8 3364.5 4223.8	5955.7 6832.7 7719.8 8618.8 9531.5	11402.6 12363.1 13341.3 14337.9 15353.4	17444.1 18521.2 19621.1 20746.0 21898.4	23082.1 24301.9 25564.5 26879.3 29584.8 31366.2	25575.6 25575.6 259847.3 41776.0 43424.4 44954.2 46407.5	50531.4 51868.0 54523.2 59848.3 62546.0 66046.1 73706.1
sobar at	Internal Energy J/mol	6.9 335.5 1189.9 2041.8 2893.0 3745.5	5463.3 6333.0 7212.5 8103.7 9008.1	10861.7 11812.8 12781.2 13767.2 14771.6	16837.5 17900.7 18985.5 20093.7 21227.7	22390.6 23586.8 24822.1 26104.3 27445.1 28717.7	24234.2 26377.8 28174.5 39748.5 41167.2 42490.0 43753.9 44981.8	47382.1 48570.3 50946.2 53358.9 55761.6 58221.7 63270.3
Propane 1	isotherm Derivative MPa·m3/kg	3.07867 2.98345 2.75524 2.55065 2.36467 2.19375	1.88739 1.74859 1.61781 1.49421 1.37712	1.16056 1.06036 .96518 .87482 .78911	.55861 .49031 .42615	.30996 .25782 .20962 .16537 .12520 .08936	.02172 .02025 .02266 .02703 .03725 .04229	.05622 .06049 .06855 .07606 .08313 .08384 .10236
	lsochore Derivative MPa/K	3,108649 3,002259 2,751034 2,531051 2,336025 2,161357	1.860029 1.728587 1.607570 1.495604 1.391561	1.203624 1.118266 1.037850 .961881 .889932	.756641 .694683 .635497 .578852	.472348 .422102 .373605 .326654 .281015 .236405	.05262 .06563 .06563 .06562 .045300 .040070 .036128	.028456 .026701 .025882 .019957 .018520 .016278
	7	.62801 .60443 .55154 .50842 .47263	.39474 .37559 .35886 .34419 .33126	.30974 .30081 .29292 .28598 .27991	.27022 .26654 .26363 .26151 .26023	.25988 .26060 .26263 .26633 .27234 .28187 .29737	. 57326 . 44782 . 56768 . 5676 . 61698 . 65861 . 65861	.77301 .79323 .82734 .85495 .87770 .92646
	sity kg/m3	.73509E+03 .73122E+03 .72120E+03 .71125E+03 .70135E+03 .69149E+03	.67179E+03 .66192E+03 .66192E+03 .65201E+03 .64204E+03 .63199E+03	.61153E+03 .60107E+03 .59043E+03 .57955E+03 .56842E+03	.54519E+03 .53298E+03 .52029E+03 .50703E+03	.47832E+03 .46253E+03 .44547E+03 .42673E+03 .40571E+03 .38140E+03 .35201E+03	.26642E+03 .26642E+03 .20642E+03 .18655E+03 .16510E+03 .14652E+03 .13421E+03 .12464E+03 .11690E+03	.10502E+03 .10029E+03 .92459E+02 .86159E+02 .7648ZE+02 .69250E+02 .65548E+02
	Density mol/L	. 1667E+02 . 1658E+02 . 1635E+02 . 1613E+02 . 1590E+02 . 1568E+02	1523E+02 1501E+02 1479E+02 1456E+02 1433E+02	.1387E+02 .1363E+02 .1359E+02 .1314E+02 .1289E+02	.1236E+02 .1209E+02 .1180E+02 .1150E+02	.1085E+02 .1049E+02 .1010E+02 .9677E+01 .9200E+01 .8649E+01	. 6042E+01 . 4997E+01 . 4997E+01 . 3699E+01 . 3323E+01 . 3044E+01 . 2826E+01 . 2651E+01	.2381E+01 .2274E+01 .2097E+01 .1954E+01 .1735E+01 .1576E+01 .1576E+01
	Temp.	86.165 90.000 100.000 110.000 120.000 130.000	150.000 170.000 180.000 190.000	210.000 220.000 230.000 240.000 250.000	270.000 280.000 290.000 300.000	320.000 330.000 340.000 350.000 370.000 380.000	410.000 420.000 420.000 450.000 440.000 450.000 470.000	490,000 500,000 540,000 560,000 580,000 620,000 650,000

		ielectric Constant	2.09304 2.08467 2.06319	2.04248	2.00280	1.98363	1.94623	1,92786	1.89149	1.87337	370	1.81868	1 -80015	1.76228	1.74280	1.70235	1.68116	1.65915	1.63615	1.58615	1.55841	940	1.45485	1.40791	1.29316	1.24670	1.21295	1.17071	0000000	0.0000	00000	00000000	0.0000	000000	0000000	000000	0.00000
		Vel. of Sound D m/s	2044 2018 1951			1708	1595	1539	1428	1372	1262	1207	1152	1097	986	874	818	762	706	591	534	399	352	297	225	218		233			265			309		338	
		Fugacity/ Pressure Ratio	55709E-10 23103E-09 56657E-08	74260E	5179E	.15358E-04	15806E	40198	18578E	34977E-02	10130E-01	.15870E-01	23756E-01	47476E-01	.63951E-01	.85819E-01	13416E+00	16458E+00	.19833E+00	27486E+00	31707E+00	40676E+00	45287E+00	49785E+00 54044E+00	57917	61363	64408E+00	69542E+00	.71736E+00	.73732E+00	77231E+00	770	81508E+00		87691E+00	90625E+00	94722E+00
		Cp J/(mol•K)	84.02 84.18		6.33	7.00	90	89.47	. / / 0	8 -						110.91						177.42		•	215.33	•	•	153.66			136.58		•	135.12		2 4	8.25
		Cv J/(mol•K)	61.97	man C	60.83	60.83	61.09	61.35	62.13	62.66	64.00	64.82	65.76	67,98	69.28	77, 29	74.02	75.90	77.94	82.41	84.66	111.43	98, 16	97.67	99.11	99.56	100.03	101.52	102.53	103.68	106.24	107.60	110.42	116.21	119,10	124.76	135.40
	C	Entropy J/(mol•K)	82.650 86.397 95.510	103.694	118.012	124.402	136.063	141.448	151,531	156.289	165,354	169.696	173.930		186.092	193,846	197.648	201.414	205, 159	212.638	216,408	223.777	228.366	233,141	243.723	248.693	255.10/	260.601	263.897	266.996	272.783	275.528	280.805	290,761	22		322.215
Sontinu	= 8.0 MPa	Enthalpy J/mol	487.3 814.2 1674.8	2533.0	4249.8	5112.6	6858.0	7744.8	9555.8	10482.8	12385.6	13363.0	14358.7	16406.8	17460.7	19633.1	20754.8	21903.2	23081.7	25547.8	26849.2	29501.3	31222.8	33061.6	37295.5	39357.6	41252.9	44527.7	46026.8	47467.8	50245.2	8	54294.3	59668.3	-	67911.5	79438.0
	sobar at P	Internal Energy J/mol	7.4 331.9	2037.2	73	4595.2	6325.3	7204.0	8997.9		11799.7	12766.1	13750.5	15774.2		18956.3	20060.6	21189.7	22346.6	24760.0	26028.2	28589.0	30242.4	31982.9	35846.0	37661.3	59290.6	42142.0	43445.5	44704.9	47151.4	48357.0	0760	55612.4	8085.	63153.8	73828.6
Ţa	Propane 1	lsotherm Derivative MPa·m3/kg	3.08310 2.98908 7.76094	2.55644	1997	2.04140	1.75495	1,62430	1.38390	1.27297	1.06760	.97259	.88239	.71584	.63923	. 56692	.43490	.37504	.31919	.21941	17547	. 10002	•06926	04455	.02342	.02426	•02/15	.03611	.04094	.04570	.05480	.05911	.06730	.08218	.08902	.10180	.12480
		lsochore Derivative MPa/K	3.108853 3.003866 7.752823	2.532984	2,163518	2.005840	1.731022	1.610092	1.394269	1.297306	1.121298	1.041009	.965182	825258	.760470	6398756	.583457	.529486	477711	.380069	.333878	.245929	.203845	.163040	.094427	.074190	.060948	.045549	.040770	.037057	.031632	.029578	.026308	.021817	.020191	.017673	.014333
		7	.66941	.54216	.47184	.44445	.40045	.38261	.35315	.34095	32061	.31217	.30474	. 29262	.28782	28584	.27830	.27682	.27629	.27868	.28214	.29655	.31029	.33267	.42519	.48574	54525	.63765	.67492	. 73492	.75937	° 78098	.81740	.87110	.89132	.92294	.96378
		ity kg/m3	.73521E+03 .73139E+03	.71145E+03	.69171E+03	.68188E+03	.66221E+03	.65232E+03	.64238E+U3	.62222E+03	.60154F+03	.59094E+03	.58012E+03	.55769E+03	.54598E+03	.5558/E+05	.50819E+03	.49443E+03	.47991E+03	.44780E+03	.42966E+03	.38669E+03	•35985E+03	.32703E+03	.24339E+03	.20797E+03	.18165E+05	.14787E+03	.13666E+03	.12768E+03	.11403E+03	.10866E+03	.99822E+02	.86978E+02	.82073E+02	•74148E+02 67941E+02	.62891E+02
		Density mol/L	.1667E+02 .1659E+02	1613E+02		.1546E+02	.1502E+02		.143/E+UZ	1411E+02	1364F+02	-	.1316E+02	.1265E+02		. 1211E+02	.1152E+02	•1121E+02	.1088E+02	.1015E+02	.9744E+01			.7416E+01	.5519E+01	.4716E+01	.4119E+01	.3353E+01	.3099E+01	.2896E+01			.2264E+01	.1972E+01	.1861E+01	.1681E+01	.1426E+01
		Temp. K	86.211 90.000				160,000		190.000		220-000			250-000		280.000			320,000					390.000			450.000			4 /0.000	000		520.000			620.000	700.000

	Dielectric Constant	2.09320 2.08494 2.06349 2.04280	2.00317	1.92836	1.87401	1.83777	1.80105	1.76338	1.72424	1.68294	1.65853	1.61473	1.56257	1.53333	1.46454	1.37275	1.27223	1,23591	1.18795	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Vel. of Sound m/s	2045 2019 1952 1889	1768	1597	1431	1266	1156	1046	936	825	770	658	546	490	371	272	229	227	235	242	257	264	285	297	318	337	369
	Fugacity/ Pressure Ratio	.55674E-10 .22638E-09 .55320E-08 .72301E-07	.34100E-05 .14862E-04	.15254E-03 .38749E-03	.17875E-02 .33629E-02	.97265E-02	.22789E-01	.45507E-01	.80299E-01	.12848E+00	.15760E+00	.22520E+00	.30371E+00	.34594E+00 .38995E+00	.43450E+00	.52024E+00	.59452E+00	.62613E+00	.67994E+00	.70301E+00	.74321E+00	76084E+00	1 1 1 1	.83074E+00	87102E+00	.90195E+00	94512E+00
	Cp J/(mol•K)	84.01 84.18 84.64 85.15	86.31	88.54	91.52	95.50		102.90	107.80	113.78	117.28	125.61		142.41		199.83	195.88	181.36	أ ص ،	150.44	\ <t< td=""><td>138.93</td><td>135.63</td><td>135.44</td><td>-1 C</td><td>140.61</td><td></td></t<>	138.93	135.63	135.44	-1 C	140.61	
	Cv J/(mol•K)	61.99 61.81 61.41 61.13	60°85	61.11	62.15	64.02	65.78	67.99	70.73	74.03	75.91	80.12	84.62	86.11	97.37	98.01	99.63	100.27	101 .84	102.84	105.18	106.47	110.60	113.46	119.22	124.85	135.46
Ø	Entropy J/(mol•K)	82.655 86.356 95.468 103.651	124.355	136.013 141.397	151.475	165.290	שונא ע	182.036	189.903	197.534	201.288	208.733	216.186	219.971	227.896	237.296	247.242	251.679	259,357	262.742	268.932	271.821	279.955	285.067	294.798	304.059	
P = 8.5 MPa	Enthalpy J/mol	517.7 840.6 1701.1 2559.3 3416.8	4275.8 5138.4	6883.4 7769.9	9580.1 10506.6	12408.2	14379.5 15300 B	16425.2	18550.4	20764.0	21908.6	24288.8	26822.7	28165.8 29429.6	31105.0	34773.0	38849.5	40734.6	44110.6	45650.5	558.	49959.5		56774.5 50788 8	62222.2	67777.6	79340.8
sobar at F	Internal Energy J/mol	8.0 328.3 1181.7 2032.6 2882.7	3734.1 4588.9	6317.6 7195.6	8987.7 9904.6	11785.6	13734.0	15753.9	17849.4	20028.1	21152.6	23484.9	25955.9	27258.4 28472.1	30082.5	33531.8	37202.7	38857.3	179	45135.0	45682.4	46918.3	50572.8	53007.2	7948	63037.3	73737.9
Propane 1	lsotherm Derivative MPa·m3/kg	3.08753 2.99471 2.76665 2.56223 2.37644	2.20573 2.04750	1.63078 1.63078	1.27987	1.07482	.88994	.72373	.57519	.44357	.328393	.27670	.18537	.11037	.05442	.03651	.02684	.02851	.03572	.04018	.04926	.05369	.06625	.07401	.08830	.10131	.12469
	lsochore Derivative MPa/K	3.109062 3.005475 2.754613 2.534918	2.165676 2.008093	1.733452	1.396968	1.124315	.968461	.828860	.702744	.587993	.534350	.433663	.340807	.296998	.214123	.138632	.085000	.069717	.051443	.045/55	.037860	.035002	.028855	.026001	.021920	.019108	.015417
	2	.71075 .68470 .62477 .57589	.50117	.42530 .40633 .80633	.37500 .36203	.34038	32347	31052	.30108	.29504	.29334	.29298	.29786	.30313	.32363	.37321	.47159	.52509	.61910	.69129	.72064	.76931	.80787	.83906 .86473	.88614	.91956	.96267
	sity kg/m3	.73532E+03 .73156E+03 .72156E+03 .71164E+03	.69194E+03 .68213E+03	.66249E+03 .65263E+03 .65263E+03	.63271E+03 .62261E+03	.60201E+03	.58069E+03	.55838E+03	. 53475E+03	.50933E+03	.49575E+03 .48145F+03	.46628E+03	.43244E+03	.41510E+03	.35657E+03	.30198E+03	.22760E+03	.19966E+03	.16181E+03	.13875E+03	.13033E+03	.12325E+03	.10731E+03	.99496E+02	.87713E+02	.79072E+02 .72346E+02	.66899E+02
	Density mol/L	.1668E+02 .1659E+02 .1636E+02 .1614E+02	.1547E+02	. 1502E+02 . 1480E+02	. 1435E+02 . 1412E+02	.1365E+02	•1317E+02	. 1266E+02	. 1213E+02	• 1155E+02	.1124E+02 .1092F+02	.1057E+02	.9806E+01	.9368E+01	.8313E+01	.6848E+01	.5161E+01	.4528E+01	.3669E+01	.35/9E+01	.2955E+01	.2795E+01	.2434E+01	.2256E+01	. 1989E+01	.1793E+01 .1641E+01	.1517E+01
	Temp.	86.258 90.000 100.000 110.000	130.000	160.000 170.000	190.000	220.000	240.000	260.000	280.000	300.000	370.000	330.000	350.000	360.000	390.000	400.000	420.000	430.000	450.000	450.000	480.000	500,000	520.000	540.000	580.000	620.000	700.000

	Dielectric	2.09336 2.08522 2.06378	200	.0035	1.98443	94	9288	1.89265	1.87464	1.83852	1.82032	1.80195	1.76448	1.74525	1.70544	1.68468	1.66319	1.64085	1.59278	1.56653	1.50740	1.47310	1.45424	1.34147	1.29547	1.22827		000000	000000	0.0000	0.0000	0 0		0.0000	0.0000	0000000
	Vel. of Sound I m/s	2046 2020 1954	1890	1770	1712	1599	1544	1433	1379	1269	1215	1160	1051	966	941	832	777	722	612	558	430	389	559 294	259	241	235	238	244	257	264	784	296	308	518	354	370
	Fugacity/ Pressure Ratio	.55828E-10 .22259E-09 .54203E-08	706	.33169E-05	• 14431E-04	9	.37481E-03	? 	90	93719F-02	.14667E-01	21936E-01	43771E-01	58924E-01	98694F=01	12346E+00	,15143E+00	.18247E+00 .21638F+00	25294E+00	.29189E+00	.37506E+00	41819E+00	.460 / /E+00	.54088E+00	.57670E+00	.63847E+00	,66501E+00	.68910E+00	,73118E+00	.74965E+00	79689F+00	37	554E+0	86526E+00	2	94308E+00
	Cp J/(mol•K)	84.01 84.17																120.67						197.55	193.30	170.76	161.23			141.18		136.64	157.08	158-12	144.96	
	Cv J/(mol•K)	62.01 61.83 61.43	61.15	60.87	60.87	61.13	61.39	62.17	62.70	64.04	64.86	65.79	68.01	69.31	70.32	74.04	75,92	77.95	82.38	84.58	111.22	97.80	97,72	98°98	99,59	101.20	102.10	103,10	105.42	106.69	110.77	7 17 1	9	119.53	130.35	135.52
o	Entropy /(mol•K)	82.661 86.315 95.426	103.608	117.922	124 . 309	135.964	141,346	140.48/	156,173	165,226	169.561	173.787	181,956	185.917	189,809	197.422	201.164	204.879	212.270	215.974	223.110	227.479	251.879	241.251	245.987	254.453	258, 180	261.638	267.952	270.891	279.126	284.299	289.274	294 • 101	35.	320.996
Continued)	Enthalpy J/mol	548.1 867.1 1727.5	2585.5	4301.7	5164.2	6908.7	7795.0	9604.4	10530.5	12430.9	13406.7	15/12 6	16443.7	17494.3	18565.4	20773.7	21914.7	23083.7	25520.9	26799.3	29367.5	31006.0	32/00.5	36450.1	38415.8	42053.1	43711.6	45284.4	48251.2	49676.4	53838.2	56574.1	59310.1	62061.4	0	79244.4
ble 21。 (sobar at P	nal gy	8.5 324.7 1177.6	2028.0	3728.4	4582.6	6309.9	7187.2	8977.5	9893.5	11772.1	12736.3	13717.6	15733.8	16769.4	1824.4	19996.2	21116.2	22261.9	24643.2	25887.1	28364.7	29940.5	31552.2	35029.3	36797.3	40004.9	41453.6	42826.8	45427.4	46684.2	50384.4		55312.2	57812.0	68196.1	73647.5
Tab Propane 19		3.09196 3.00034 2.77235	2.56802	2.21171	2.05359	1.76763	1.63725	1.39740	1.28677	1.08201	.98732	89745	.73159	.65534	51571			.33735							.03016		.03614	.04007	.04863	.05295	05/20	.07323	.08064	.08/69	.11314	.12463
	sochore Derivative MPa/K	3.109276 3.007085 2.756402	2.536850	2,167832	2.010344	1.735877	1.615120	1.399658	1.302891	1-127318	1.047277	.971720	.832433	.768020	. /06/10	.592463	.539130	.488097	.392385	.347474	.263108	.223580	150808	.119905	.095789	.066538	.057679	.051043	.041861	038559	03150	.028287	.025754	025/08	.018291	.016523
	7	.75204 .72481 .66135	09609	.53047	.49965	.45012	.43003	. 39684	.38309	.36013	.35059	.34217	.32838	.32289	.51828	.31171	.30979	.30886	.31048	.31347	.32596	.33723	.35415	.41681	51257	. 55989	.60352	64257	.70753	•73446	79884	.83164	.85864	.91634	.94217	.96164
	ity kg/m3	.73544E+03 .73173E+03	.71184E+03	.69217E+03	•68237E+03	.66278E+03	.65293E+03	.63307E+03	.62300E+03	.60247F±03	.59196E+03	.58125E+03	.55907E+03	.54752E+03	. 55561E+03	.51045E+03	.49704E+03	.48295E+03 .46805F+03	.45217E+03	•43506E+03	.41642E+U3	.37248E+03	.34562E+05	.27932E+03	.24521E+03	.19376E+03	.17576E+03	.16149E+03	.14055E+03	•13263E+03	. 12388E+U3	.10629E+03	.99270E+02	.95596E+02	.76761E+02	•70910E+02
	Density mol/L	.1668E+02 .1659E+02	.1614E+02	.1570E+02	.1547E+02	.1503E+02	•1481E+02	.1436F+02	4		.1342E+02	1318E+02			.1215E+02	.1158E+02	.1127E+02	.1095E+02	.1025E+02	.9866E+01			./858E+01 .7128F+01	101	.5561E+01	.4394E+01	.3986E+01	.3662E+01	.3187E+01	.3008E+01	.2625E+01	.2410E+01	.2251E+01	.2118E+01	.1741E+01	•1608E+01
	Temp.	86.304 90.000	110.000	130.000	140,000			190.000		220-000		240.000			280.000			320,000			370.000		400-000	000	420,000	000	450.000	460.000			520,000			280,000		700.000

(Continued)	10 MPa
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Table 21,	Leobar
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Dielectric Constant	2.09369	2.04375	2.00428	1.96651	1.94808	1.91178	938	1.85797	1.84000	1.80372	1.78531	1.76663	1.72827	1.70844	1.68807	1.64530	1.62264	1.59892	1.57389	1.51873	1.48775	1.45376	1.37578	1.33456	1.29684	1.25955	0.00000	0.00000	0.00000	0.00000	0.000000	0.00000	0000000	00000000	
Vel. of Sound m/s	2048	1894	-		1549			1331	1276	1168	1114	1060	953	899	845	738	685	632	580 528	458	420	375	252	270	257	250	252	201	267	2/13	296	308	337	3.50	,
Fugacity/ Pressure Ratio	.56631E .21713E	.55408E-06	.31664E-05	.47631E-04	.13975E-03	.79607E-03	. 16232E-02	.50468E-02	.87788E-02	.20507E-01	.29452E-01	.40856E-01	.71969E-01	.91978E-01	.11502E+00	16994F+00	.20152E+00	.23560E+00	27196E+00	.34988E+00	.39054E+00	.43100E+00	.4/069E+00	.54485E+00	.57823E+00	.63703E400	.66281E+00	.70817E+00	.72817E+00	. 74662: 400	.80794E+00	.83257E+00	889595+00	.91729E+00	
Cp J/(mol-K)	84.00	85.12 85.66		87.66				92.87	95.29	98.56	100.43	102.48						128.08	132.84	166.57	158,24	164.13	180-93	183,93	179.37	164.27	157.91	148.36	145.10	142.82	138.97	139.00	142.37	145.85	
Cv J/(mol•K)		61.19	60.91	61.00	61.17	61.77	62.21	63.35	64.07	65.83	66.88	68.04	70.77	72.34	74.06	77.95	80.11	82.35	84 . 53	111.06	97.57	96.79	97.28	99.34	100.39	102.41	103.48	105.81	107.07	108.58	. 14]	116.71	125.11	130.49	
Entropy J/(mol•K)		103.522	117.832	130.206	135.866	146.381	151.310	156.059	165, 100	173.647	177.766	181.797	189.625	193.441	197.204	200.924	208.275	211.927	215.576	222,536	226.755	230,934	255-192	243.974	248,261	256.068	259.607	266.111	269,135	272.045	282,844	287.896	302-184	311.190	
Enthalpy J/mol		2638.0	4353.7	6083.7	6959.5	8742.6	9653.2	11519.1	12476.3	14442.5	15452.5	16481.1	18596.0	19684.2	20794.4	23089.1	24278.7	25501.2	26760.6	29265.1	30848.0	32456.7	34159°1 35908.9	37739.7	39561.3	42994.7	44604.8	47660.2	49127.0	50566.5	56179.0	58957.3	67381.4	73144.2	
Internal Energy J/mol		2018.9	3717.1	5428.6	6294.8	8057.5	8957.4	10800.5	11745.5	13685.3	14681.0	15694.2	17775.3	18844.5	19934 .2	221045.8	23343.4	24534.6	25758.3	28172.2	29695.3	31229.2	32815.4	36132.3	37771.2	40816.8	42234.5	44923.8	46218.7	50007.4		55011.2	62688.2	67993.4	
Isotherm Sotherm Derivative MPa·m3/kg	3.10083	2.57958 2.39408	2.22367	1.91845	1.78028	1.52723	1.41085	1.19577	1.09634	.91241	.82753	.74720	. 59970				30415					.08316	.06228	.03950	.03697	.03922	.04182	.04876	.05264	.05661	.07227	.07972			,
lsochore Derivative MPa/K	3.109720 3.010310	2.540715 2.346285	2.172138	1.871724	1.520125	1.508599	1.405014	1.218079	1.133282	.978180	.906973	.839495	.714517	.656512	.601215	. 548455	.449961	.404004	.360129 310202	.278443	.240641	.204996	.1/1830	.116523	.096669	.070799	062322	.050453	.046190	.042668	.033126	.029976	.023652	.020899	
7	.83445	. 67696 . 62923	.58903	.52529	.49971	.45774	.44044	.42515	.39953	.37947	.37120	.36399	.35253	.34823	.34487	34249	.34090	.34193	.34443	.35528	.36484	.37853	. 42510	.46029	.50070	.58210	.61972	.68564	.71385	78263	.81813	.84749	.91042	.93863	
i+y kg/m³	.73567E+03	.71222E+03 .71222E+03 .70240E+03	.69262E+03	.67310E+03	.66334E+03	.64370E+03	.63378E+03	.625//E+05 .61365E+03	.60339E+03	. 58235E+03	.57152E+03	.56042E+03	.53730E+03	.52518E+03	.51262E+03	.49955E+U5	.47144E+03	.45620E+03	.43995E+03	.40347E+03	.38255E+03	.35926E+03	.35514E+03	.27434E+03	.24634E+03	.20247E+03	.18605E+03	.16115E+03	.15162E+03	.14549E+05	• 12005E+03	.11175E+03	.93959E+02	.85612E+02	
Density mol/L	.1668E+02	.1615E+02 .1593E+02	• 1571E+02	.1526E+02	• 1504E+02	.1460E+02	• 1437E+02	.1415E+02 .1392E+02	.1368E+02	• 1321E+02	.1296E+02	• 1271E+02	. 1218E+02	.1191E+02	.1162E+02	• 1135E+02 1102E+02	. 1069E+02	.1035E+02	.9977E+01	.9149E+01	.8675E+01	.8147E+01	. /555E +01	.6221E+01	. 5586E+01	.4591E+01	.4219E+01	.3655E+01	.3438E+01	. 5254E+01	.2722E+01	.2534E+01	2131E+01	. 1941E+01	
Temp.	86.396	110.000	130.000	150,000	160,000	180.000	190.000	200,000	220.000	240.000	250.000	260.000	280,000	290.000	300,000	320.000	330.000	340,000	350.000	370.000	380,000	390.000	400,000	420.000	430.000	450.000	460.000	480.000	490.000	500-000	540.000	560,000	620,000	700,000	

	Dielectric Constant	2.09401	2.06496	2.04439	2.02444	<i>ا</i>	1.98601	1 04600	1 02084	1.91284	1.89496	1.87713	1.85932	1.84147	1.82353	1.800247	77/9/01	1 7/00/4	1.73087	1.71135	1.69135	1.67078	1.64955	1.62755	1.60464	1.55541	1.52865	1.50009	1.46942	1.43642	1-36486	1.32955	1.29771	1.27047	0.00000	000000	0000000	0	0.0000		0000000	00000000	0.00000	
	Vel. of Sound m/s	2051	1960	1897	1837	17/8	17.71	1600	1554	1499	1445	1391	1337	1283	1230	1107	1070	1070	963	910	858	805	753	701	650	551	483	449	406	366	300	281	271	266	265	269	272	277	287	298	319	338	356	
	Fugacity/ Pressure Ratio	.58008E-10	.51365E-08	66173E	.53641E-06	7	•15195E-04	1226E-04	• 12220E-02	-75758E-03	.15421E-02	.28901E-02	Lat	.83058E-02	. 12971E-01	- 19505E-01	20517E 01	51787E-01	67771F-01	.86574E-01	.10823E+00	.13268E+00	• 15983E+00	,18953E+00	.22160E+00	29177F+00	.32947E+00	.36808E+00	.40670E+00	.44489E+00	• 48204E+00	.55133E+00	.58271E+00	.61184E+00	.658/9E+00	.68674E+00	.70806E+00	.72778E+00	.76305E+00	.79363E+00	.82019E+00	182	.91182E+00 .93559E+00	
	Cp J/(mol•K)	83,99	84.60	85.10	85.64	86.24	86.89	00 A1	00.41	90.25	91,31	92.47	93.75	95,15	96.69	10.88	100.20	102.20	106.80	109.42	112.29	115.42	118.85	122.60	126.68	134.97	163.16	153.44	157.26	163.10	173.83	173.95	169.97	164.46	159.35	151.19	148.11	145.70	142.56	141.11	140.80	143.51	146.73	
	Cv J/(mol•K)	62.08	61.51	61.23	61.04	60.95	60.95	61.05	61 16	61,81	62,24	62.77	63.39	64.11	64.93	00.00	00.00	00.00	70.80	72.37	74.09	75.95	77.96	80.10	82.33	04.4v	110,95	97.40	96.56	96.99	90.06	100.23	101.39	102.53	105.69	106.10	107,37	108.67	1111.36	114.13	119.73	125,26	130.62	
	Entropy J/(mol•K)	82,685	95,258	M)	110.883	11/0/42	124.124	125 760	171 173	146.277	151.202	155,945	160,530	164.976	169.298	173.508	101 640	185 570	189,445	193.246	196,992	200.692	204.354	207.989	211.603	n 1	222.026	226.138	230,166	234.218	220.323	246.568	250.528	254.286	25/.843	264.444	267,528	270.496	276,142	40	291.561	301.048	310.117	
0 = 11 MPa	Enthalpy J/mol	669.9	1832.8	2690.5	3547.5	4405./	526/05	7010 2	7805 F	0 0	9702.0	10626.3	11566.0		13494.8	0 0	12497.9	17563	18627.6	h o		21944.7	23097.4	24277.4	25487.5		0 0	30727.3	32278.3	33879.0	37260.8	39003.8	40726.0	42398.4	44016.6	47117.8		50082.4	52961.5	55795.9	58515.5 61433.0	0 0	72926.3 78867.7	
sobar at P	Internal Energy J/mol	10.7	1161.4	2009.8	2857.3	5/05.8	455/0/	0414.9	715/10	8039.4	8937.5	9849.6	10776.6	11719.3	12678.1	17077.0	14047°9	16682 5	17777	18791.2	19874.3	20978.2	22104.6	23255.4	24432.9		28002.4	29486.7	30967.7	32482.3	35624.9	37212.2	38762.8	40256.8	41695.2	44442.4	45767.6	47070.7	49634.8	52173.5	57265.6	62456.7	67791.8 73288.8	
Propane 1:	lsotherm Derivative MPa∘m3/kg	3.10971	2.79516	2,59114	2.40581	2,25560	2.07791	1.95085	1 66202	1-54036	1.42425	1.31418	1.20973	1.11059	1.01651	07/76	604700	10701 •	61587	.54882	.48599	.42727	.37261	.32195	27525	19367	.15883	.12806	• 10156	.07967	.05161	.04569	.04384	.04433	04585	.05081	.05401	.05747	.06478	.07220	.08663	.10020	.11292	
	lsochore Derivative MPa/K	3,110184	2,763565	2.544577	2.350380	2.176455	2.019315	1 745575	1 625106	1.513748	1.410337	1,313941	1.223780	1.139192	1.059614	• 984564	9712078	782717	7727168	.664572	609734	.557488	.507694	.460238	.415033	331145	.292420	.255871	.221589	. 1897/3	135349	.114107	.097269	.084247	066090	.059650	.054390	•050039	.043286	.058501	.031423	.026875	.023620	
	2	.91662	.80752	.74426	.69174	.64751	.60982	.5//58	574922 57462	50301	.48394	.46707	.45210	.43883	.42705	41004	14/04	30250	38660	.38171	.37782	.37495	.37314	.37247	•37305 •37505	.37872	.38442	.39266	.40417	41996	.46847	.50112	.53662	.57238	640000	.67037	.69860	.72444	.76945	.80681	.86419	.90533	.93567	
	ity kg/m3	.73590E+03	. 72246E+03	,71261E+03	.70282E+03	.69507E+03	.68354E+03	.6/36ZE+03	.00290E+03	64435E+03	.63449E+03	.62454E+03	.61448E+03	•60430E+03	. 59396E+03	• 38344E+US	. 3/2/1E+U3	55050E+03	53895F+03	.52703E+03	.51471E+03	.50192E+03	.48859E+03	.47464E+03	.45996E+03	.42790E+03	.41017E+03	.39099E+03	.37012E+03	.54/50E+05	.29651E+03	.27075E+03	.24709E+03	•22650E+03	.20896E+US	.18131E+03	.17043E+03	.16106E+03	. 14581E+03	*15591E+05	• 12432E+U3 • 11639E+03	.10394E+03	.94472E+02 .86949E+02	
	Density mol/L	.1669E+02	.1638E+02	.1616E+02	.1594E+02	•1572E+02	.1550E+02	* 1528E+02	1/87E±02	1461E+02	.1439E+02	.1416E+02	.1393E+02	.1370E+02	•1347E+02	1025E+02	1274E+UZ	12/46+02	1222F+02	.1195E+02	.1167E+02	.1138E+02	.1108E+02	•1076E+02	.1043E+02	.9704E+01	.9301E+01	.8867E+01	.8393E+01	./8/6E+01	.6724E+01	.6140E+01	. 5603E+01	.5156E+01	.4/59E+01	.4112E+01	.3865E+01	.3652E+01	.3307E+01	205/E+01	.2639E+01	.2357E+01	.2142E+01 .1972E+01	
	Temp.		100,000	110.000	120.000	150.000	140.000	150.000	170 000	180,000	190,000	200.000	210.000	220,000	230,000	240.000	250.000	230.000	280.000	290.000	300.000	310,000	_		340.000		370.000	380.000	390.000	400.000	420.000	430.000	440.000	450.000	450.000	480.000	490.000	500,000	520.000	540.000	580.000	620,000	000°002	

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Table 21	Sobar
	Propane

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	Dielectric Constant	2.09433 2.08684 2.06554 2.04502	2.02512	1.98680	1.93181	1.89609	1.86065	1.82510	1.80718	1.77081	1.73340	1.71417	1.67435	1.65361	1.61001	1.58692	1.56281	1.51081	1.48257	1.45268	1.38871	1.35635	1.29830	0.00000	0.00000	0.00000	0.000000	0.00000	0.00000	0.00000	0.00000	0.00000
	Vel. of Sound m/s	2053 2029 1963 1901	1840	1725	1559	1451	1344	1237	1184	1079	974	922	819	768	/1/	619	572	474	434	395	530	307	284	280	6/7	281	200	305	312	321	350	373
	Fugacity/ Pressure Ratio	.59898E-10 .21253E-09 .50670E-08	.52361E-06 .29683E-05	.12783E-04 .44271E-04	шшь	• 14771E-02	.48224E-02	.12361E-01	.18434E-01	.36611E-01	.49194E-01	.82157E-01	. 12584 E+00	.15156E+00	.1/9/UE+00 .21011E+00	.24263E 00	.27677E+00	.34955E+00	.38659E+00	.42342E+00	.49460E+00	.52809E+00	.58943E+00	9	.64301E+00	.68943E+00	• / 102 IE+00	.78010E+00	.80846E+00	.83332E+00	.90666E+00	.93221E+00
	Cp J/(mol•K)	83.98 84.13 84.58 85.08	85.61	86.86	89.23	91.23	93.64	95.02	98.19	101.96	104.10			118.08	125.46	129.45		~ -+		156.65	165.65	167.63	163.38	159.39	152.58	149.91	14/•/0	142.96	2	0	144.59	9 9
	Cv . J/(mol•K)	62.12 61.96 61.56 61.27	61.08	60.98 61.07	61.50	62.28	63.43	64.97	65,90	68.11	70.83	72.40	75.97	77,97	80.32	84.46	85.83	97.28	96.40	96.78	98.82	100.05	102.54	103.78	105.02	107.58	111 50	114.34		119.91	130.74	135.85
m	Entropy J/(mol•K)	82.697 86.068 95.175 103.352	110.796	124.033	141.043	151 094	160.413	169, 168	173,372	181.486	189,269	193.056	200.467	204 • 107	211,297	214.860	218,417	225.595	229.514	233.424	241,295	245,222	252.781	256.329	096°292	266.078	274 011	280,233	285.420	290,420	299,990	9
P = 12 MPa	Enthalpy J/mol	730.7 1025.6 1885.5 2743.0	3599.7	5319.2 6186.3	7945.8	9751.0	11613.0	13539.2	14527.7	16557.4	18659.9	19740.0	21962.7	23108.4	25478.9	26708.6	27970.8	30632.7	32141.7	33686.0	36913.4	38582.1	40222.9	43521.0	45096.0	48149.1	49000°8	55430.4	0.1	61132.6	72713.8	78685.4
sobar at	Internal Energy J/mol	11.9 303.4 1153.4 2000.8	2847.3	5401.4	7137.6	8917.9	10753.0	12649.7	13622.4	15617.6	17681.0	18739.3	20913.2	22031.1	24337.2	25528.9	26748.2	29304.1	30746.1	32210.6	35226.7	36760.1	39770.1	41216.3	43995.6	45341.7	4000000	51847.4	54416.3	56995.8	67591.9	73111.7
Propane 1:	lsotherm Derivative MPa•m3/kg	3.11859 3.03414 2.80655 2.60269	2.24752	1.94317	1.67585	1.43760	1.22363	1.03097	.94201	.77802	.63177	.56507	.44413	.38977	.29297	.25045	.21181	.14624	.11943	.09681	.06523	.05658	.05077	.05125	.05457	.05698	.05980	.07309	.08010	.08705	.11331	.12544
	Isochore Derivative MPa/K	3.110667 3.016777 2.767149 2.548437	2.354470	2.025783	1.630064	1.415627	1.229435	1.065689	.990875	.853300	.729672	.672456 618038	.566259	.516986	.425553	.383256	.343188	.269747	.236464	.205615	.152208	.130412	.097692	.086070	.076705	.062982	02/000	.043772	.039206	.035597	.050245	.023602
	7	.99857 .96511 .88049	.70593	.62938	.57179	.52735	.49255	.46511	.45368	.43475	.42/0/	41499	.40717	.40489	.403/0	.40537	.40844	.42050	.43037	•44362	.48300	.50961	.57117	.60258	.66183	.68907	75070	.79803	.83039	.85782	.93336	.95767
	sity kg/m3	.73612E+03 .73272E+03 .72282E+03 .71300E+03	.70323E+03 .69351E+03	.68382E+03 .67414E+03	.65475E+03	.63518E+03	.61530E+03	.59494E+03	.58451E+03	.56304E+03	.54055E+03	.52883E+03	.50422E+03	.49121E+03	.46348E+03	.44858E+03	.43284E+03	.39829E+03	.37918E+03	.35866E+03	.31373E+03	.29043E+03	.24762E+03	.22961E+03	.20034E+03	. 18849E+03	16110E±03	. 14769E+03	.13686E+03	.12792E+03	.11590E+05 .10332E+03	.94939E+02
	Density mol/L	.1669E+02 .1662E+02 .1639E+02 .1617E+02	.1595E+02 .1573E+02	.1551E+02 .1529E+02		.1440E+02	.1395E+02	.1349E+02	.1326E+02	. 1277E+02	.1256E+02	.1199E+02	.1143E+02	.1114E+02	.1051E+02	.1017E+02	.9815E+01	.945/E+01	.8599E+01	.8134E+01	.7115E+01	.6586E+01	.5615E+01	.5207E+01	.4543E+01	.4274E+01	*4040E+01	.3349E+01	.3104E+01	.2901E+01	.2343E+01	.2153E+01
	Temp.	86.581 90.000 100.000	_	150.000	170,000	190,000	210.000	230,000	240.000	260,000	280.000	290.000	310.000	320,000	340,000	350,000	360,000	380,000	390.000	400.000	420.000	430.000	440.000	460.000	4 70 000	490,000	520 000	540.000	560.000	580.000	000.029	700.000

		Dielectric Constant	2.09465 2.08738 2.06613	2.04564	2.00647	1.98758	1.95080	1.93278	1.89722	1.87958	1.84434	8266	1.80887	1.79095	1.75450	1.73587	1.71692	1.67779	1.65749	1.63661	1.59277	1.56962	1.54551	1.52052	1.46639	1.43766	1.37843	1.34964	1.32283	000000	0000000	000000	0.0000	00000000	0.0000	0.0000	000000	0.00000
		Vel. of Sound m/s	2055 2032 1966	1904	1786	1729	1618	1564	1456	1403	1297	1244	1192	1140	1036	984	933	832	782	733	684	592	527	49/	423	388	334	315	303	293	292	292	294	307	316	525	3,59	375
		Fugacity/ Pressure Ratio	.62263E-10 .21261E-09 .50332E-08	51468F	0906	.12471E-04	.12487E-03	.31403E-03	.14247E-02	.26619E-02	.463/8E-02	.11860E-01	.17671E-01	25315E-01	•47053E-01	.61508E-01	.78501E-01	.12016F+00	.14469E+00	. 17153E+00	.20057E+00	26428	.29868E+00	.5540/E+00	.40537E+00	.44051E+00	.4/488E+00	53966	.56965E+00	.62437E+00	.64917E+00	7237	.0340ZE+00	.76741E+00	.79740E+00	25/5E+0	86/48 90180	.92906E+00
		Cp J/(mol•K)	83.97 84.12 84.57	85.06	86.18	86.82				92.29							108,59				124.39	131,25	158,30	14 / 002	151.99	155.80	161.91	162.53	161.20	155.71	153.02	150.77	146.08	144.47	143.83	5°0	n a	151.71
		Cv J/(mol•K)	62.16 62.00 61.60	61.30	61.02		61.28	61.54	62.32	62.84	64.18	65.00	65.93	66.98	69.44	70.86	72.42	75.99	77.99	80.11	82.31	85.79	110.81	V . V	96.62	97.49	99.88	101,18	102.49	105.09	106.40	107.72	111.77	114.53	117.30	0 1	130.86	200
		Entropy J/(mol•K)	82.709 85.987 95.092	103.267	117.564	123.942	135.574	140.943	150.986	155,721	164-731	169.040	173.237	177.532	185,254	189,096	192.871	190.380	203.869	207.453	211.006	218.048	221,145	225.108	232.748	236.547	244.129	247.863	251.504	258.401	261.650	264.781	273, 589	279.068	284.308	289.355		0.0
Contin	= 13 MPa	Enthalpy J/mol	791.6 1078.4 1938.2	2795.5	4509.8	5370.9	7112.1	7996.2	980000	10722.5	12613.7	13583.8	14570.7	15574.8	17635.6	18693.1	19769.4	21982-4	23121.7	24285.2	25474.8	27939.5	29071 .0	5055/65	0 0	35075.6	38260.0		41504.1	4675		7737.	52183.1	55086.8	57968.3	60844.9	72507.4	78508.1
<u> </u>	Isobar at P	Internal Energy J/mol	13.1 296.4	1991.9	3683.7	4533.2	6250.0	7121.4	8898.5	9806.8	11667.9				16599.6		18689.0	1976U°5	21960.6	23092.2	24246.7 25425.4	26628.8	-		31979.9		36389.4		39348.6		3588.	4947	46266.9	51530.8	54127.3		67394.1	72936.3
Jawa	Propane Is	lsotherm Derivative MPa·m3/kg	3.12749 3.04540 2.81795	2.61424	2.25942	2,10214	1.81803	1.68864	1.45089	1,34135	1.13887	1.04534	.95667	.87268 70324	° 7 1823	.64756	58114	46076	.40665	.35653	.31033	.22950	.19480	16001	.11367	.09453	06886	.06213	05874	.05823	.05954	.06129	06879	.07495	.08150	.08816	11409	.12626
		lsochore Derivative MPa/K	3.020019	2.552295	2,185003	2.028239	1.755105	1.635000	1.420885	1.324838	1.150855	1.071703	.997116	.926683	.796925	.737039	.680174	574790	. 525984	.479624	.435631	.354549	.317419	.2825/5	.219927	,192321	.145443	. 126597	.110872	.087505	.078911	.071789	056443	.049491	.044162	.059958	029380	.026123
		7	1.08030 1.04506	.87863	,76426	.71969	.64800	61887	.57068	.55066	51700	.50306	,49061	.47960	.46148	.45422	.44810	44509	.43640	.43479	.43442	.43789	.44209	.44828	.46816	.48278	.52322	.54860	.57610	.63225	.65920	.68492	75362	.79200	.82493	.85515 	93179	.95733
		11ty kg/m3	.73635E+03 .73305E+03	.71338E+03	.69396E+03	.68430E+03	.66501E+03	.65534E+03	• 63588E+03	.62604E+03	. 60608E+03	. 59590E+03	.58556E+03	.57504E+03	. 55335E+03	54211E+0	.53057E+03	. 50643F+03	.49373E+03	.48054E+03	.46680E+03 .45244E+03	.43737E+03	.42151E+03	.404/2E+US	.36818E+03	.34832E+03	.30645E+03	.28563E+03	.26596E+03	.23202E+03	.21790E+03	.20544E+03	17594F+03	.16121E+03	• 14925E+03	103034E+03	.11211F+03	.10289E+03
		Density mol/L	.1670E+02 .1662E+02	-	.1574E+02	.1552E+02	.1508E+02	.1486E+02	.1442E+02	denn 4	1374F+02	.1351E+02	.1328E+02	• 1304E+02	. 1255E+02		• 1203E+02	.1148F+02	.1120E+02	.1090E+02	.1059E+02	。9918E+01	.9559E+01	91/9E+01	.8349E+01	. 7899E+01	. 6949E+01	.6477E+01	.6031E+01	. 5262E+01	.4941E+01	.4659E+01	. 3990F+01	.3656E+01	.3385E+01	2808E+01	.2542F+01	.2333E+01
		Temp. *	86.674 90.000		130.000	150.000	160,000	170.000	190.000	200.000	220.000	230.000	240.000	250,000	270.000	280,000	290.000	310,000			350,000			280.000			420.000	440.000	450.000	470.000	480.000	490.000	520,000	540,000	560.000	280.000	660.000	700.000

	Dielectric Constant	2.09497	2,08792	2.06671	Z.04627	2.00719	0000	0000	90900	80106	955/4	18016	.89855 66070	0/000	84575	04070	81054	7777	77483	75669	.73829	.71959	.70055	.68112	66123	.64083	•61987	.59826	07/77 E E D O E	.52890 .52890	50404	.47827	.45165	.4244C	.39695	.56997	7744000	000000	0.0000	00000	00000	00000	00000	00000	0.0000	00000	0.0000	
	Vel. of Sound Die m/s Co			1970 2.		1790 2				_ •		1215	- •	1409 1.		1004 10	- ,-					,-	-	_			-	654 1.		519			_		,	359 1.					0	°°	0		5.50	o c	377 0.	
	Fugacity/ V Pressure Ratio			.50295E-08	50000F 06	- 20669E-00	122201	122395-04	12107E 02	12187E-US	.50581E-05	*08205E-U5	0 1 38 2 3 E - U Z	44966E-02	**************************************	114475-01	17039F-01	24 390 F-01	33734E-01	45268E-01	.59142E-01	.75446E-01	.94210E-01	• 11540E+00	• 13893E+00	• 16468E+00	19255E+00	22258E+00	206001100	22101F+00	35550E+00	.39006E+00	.42430E+00	45798E+00	9	522156400	7	60767E+00	63302E+00	65685E+00	.67920E+00	71983E+00	75559E+00	78703E+00	14756	86090E+00	92615E+00	
	Cp J/(mol•K)	83.96		84.00				n ~	-	07.00			70.00			06 24				.55	19					119.99		126.95	129.60	144.74	145.88	44	et		157.15	158.52	D.	155, 19	153.04	151.07	149.45	147.06	9.	4	145.05		152.34	
	Cv J/(mol•K)	62, 19	62.04	61.65	01.04	61.06		01.00	61 23	01.52		76.10	02.20		07.00	27.04	65,97	, ,	68, 18	69,47	70.89	72.45	74.16	76.01	78.00	80.12	82.31	84.43	110 76	97, 12	96.18	96.50	97.35	98.47	99.74	101.06	102.41	105.11	106,46	107.81	109.17	111,91	9.	117.45	11	-	136.05	
	Entropy J/(mol•K)	82,721	85,905	95,009	110 602	117.476		120 021	125,021	170.0470	140.844	140,007	150.880	160 101	164.610	168 013	173, 104	177, 192	181,186	185,095	188.927	192.690	196.390	200.038	203,639	207.201	210.728	214.226	20/0/17	220-133	228.433	232,156	235.859	239.548	243.218	246.850	253 885	257,245	260,489	263.624	266.659	272.471	277,991	283.273		2/0°867	316.176	
P = 14 MPa	Enthalpy J/mol	852.4	1131.2	1990.9	2204 2	4561.8	54.00	1.0256	0.6020	0.0017	8040.0	4-1-60	104770	11707	12650.0	12628 6	14614.0	15616.2	16635.6	17672.4	18727.0	19799.8	20891.8	22003.8	23137.2	24293.6		26681.6	0.01912	30496.7	31947.9	33418.7	34918.3	36449.4	38009.1	59588./	72753.7	44315.9	45857.0	47377.3	48879.7	51843.0		57673.0	605/2.1	77200 1	78336.2	
	Internal Energy J/mol	14.3	289.4	115/•6	1980.	2672.8	1521 1	5277 K	004/CC	7105	7007	7.006/	0705	0.0016	11642.7	12594 2	13561.5	14544.7	15544.0	16559.5	17591.4	18640.0	19705.9	20789.8	21892.9	23016.1	24160.8	25527.9	2021/02	78993.0	30380.5	31778.5	33194.3	34629.0	36078.3	5/555.9	00000 00000	41829.8	43218.2	44585.2	45934.7	48595.9	51226.8	53847.1	564/2.1	67///00	72763.0	
Propane Isobar at	Isotherm Derivative MPa·m3/kg	3.13640	3.05667	2.82954	7 44005	2.27130	2 11/20	1 06770	1 020119	1.05000	1./0159	1 46414	1 25405	1 25122	1.15290	1 05064	97123	88751	80834	.73360	.66320	.59704	.53505	.47716	.42329	.37338	.32737	.28519	.24019	18114	. 15383	.13022	.11033	.09424	.08196	.07338	00000	06474	.06526	.06651	.06815	.07242	077700	.08371	.08998	0.10275	.12740	
	lsochore Derivative MPa/K	3.111693	3.023266	2.1/4521	161066.7	2,189275	7 03050	1 800256	1 750965	1 62001	1.0009915	1 426 112	1.420112	1 240616	1.156610	1 077650	1.003288	933089	.866712	.803860	.744274	.687737	.634063	.583099	.534716	.488815	.445318	.404169	0000000	294554	.262633	.233068	.205923	.181293	.159299	. 140051	100724	.098211	.088656	.080682	.073964	.063340	.055401	.049297	.0444/9	785/50.	.028718	
	7	1.16180	1,12495	1.02623	1/046.	82253	77451	72217	11001.	171600	• 000388	*0000	180109	57272 57212	し し し し し し し し し し し し し し し し し し し	54080	52741	51547	50495	.49575	.48779	.48103	.47543	.47098	.46768	.46558	.46471	.46518	•40/09	47594	.48336	.49317	.50572	.52130	. 54003	. 56 168	61073	63619	.66120	.68533	.70840	.75105	.78878	.82168	.85020	.8962/	.95757	
	:i+y kg/m ³	.73658E+03	•73338E+03	• 72555E+05	./15/0E+U5	694405E+U3	601775403	67516E±03	666666403	*000000E+00	• 65595E+05	.0402/E+U5	• 62670E+U2	616025403	60695F+03	50685F403	58660F+03	57618F+03	.56557E+03	.55473E+03	.54364E+03	.53227E+03	• 52059E+03	.50856E+03	.49614E+03	.48328E+03	.46993E+03	.45605E+05	. 44127E+U3	.42642E+U3 .41055F+O3	.39388E+03	.37640E+03	.35811E+03	.33913E+03	.31976E+03	.50044E+03	26430F±03	.24832E+03	.23395E+03	.22111E+03	.20963E+03	.19012E+03	.17432E+03	.16137E+03	.1505/E+05	12087E+U5	.11077L+03	
	Density mol/L	.1670E+02	•1663E+02	• 1641E+02	. 1519E+02	1575F±02		15215402	1001ETUZ	1209E+02	. 148/E+02	1460E+UZ	* 1444E+UZ	12005102	1376F±02	12525102	1330F+02	1307F+02	1283E+02	.1258E+02	.1233E+02	.1207E+02	.1181E+02	.1153E+02	•1125E+02	•1096E+02	• 1066E+02	.1054E+02	• 1001E+02	9310F+01	.8932E+01	.8536E+01	.8121E+01	.7691E+01	•7251E+01	. 68 3E +01	5994F+01	. 5631E+01	.5305E+01	.5014E+01	.4754E+01	.4311E+01	.3953E+01	.3659E+01	2070F+01	2740E+01	.2512[+01	
	Temp.	86.766	90.000	100,000	000.001	120,000		140.000			000.071	180.000	000.061	210,000	220 000	000.022	240,000	250-000	260,000	270,000	280,000	290.000	300,000		320,000	330°000	340.000	250.000	200 000	380,000	390,000	400,000	410.000	420.000	450,000	440.000	460.000	470,000	480.000	490.000	500,000	520.000	540.000	560.000	280,000	000 079		

Table 21. (Continued) Propane Isobar at P = 16 MPa

Dielectric Constant	2.09560 2.08898 2.06786 2.04751	2.00862 1.98989 1.97153	1.93564 1.91802 1.90053	1.86582 1.84851 1.85118 1.81380	1.7803 1.7870 1.76093 1.74295	1.70624 1.68744 1.66829 1.64875	1.60835 1.58742 1.56596 1.54394 1.52137	1.47465 1.45070 1.42661 1.40270 1.37939 0.00000	000000000000000000000000000000000000000
Vel. of Sound m/s	2062 2041 1976 1914	1797 1741 1686 1632	1579 1526 1473 1421	1369 1317 1266 1215	1114 1064 1014 965	916 868 821 775	686 645 583 558 524 491	460 431 484 366 352	242 234 321 321 331 341 342 369 369
Fugacity/ Pressure Ratio	.72121E-10 .21982E-09 .50951E-08 .63779E-07	28160E-05 11962E-04 40941E-04	.29426E-03 .65427E-03 .13202E-02 .24553E-02	.42603E-02 .69657E-02 .10820E-01	.31720E-01 .31720E-01 .42510E-01 .55474E-01	.88206E-01 .10797E+00 .12992E+00 .15395E+00	20785E+00 23723E+00 26829E+00 30039E+00 33295E+00	.39843E+00 .43084E+00 .46261E+00 .49351E+00 .52339E+00	57946E+00 65020E+00 65324E+00 65534E+00 73458E+00 74846E+00 79855E+00 84903E+00 88906E+00
Cp J/(mol•K)	83.95 84.08 84.52 85.00	86.09 86.72 87.41	89.01 89.01 90.93	93.23 94.54 95.97	101.05 105.20 105.20 107.52			145.57 147.94 150.14 151.90 152.97	152.85 151.952.85 150.84 147.95 146.95 146.67 150.46 150.46
Cv J/(mol•K)	62.27 62.12 61.71 61.73	61.13	61.09 62.42 62.95	63.57 64.28 65.10 66.03	68.24 68.24 69.53 70.95	74.21 76.05 78.03 80.14 82.32	84.41 85.73 110.69 97.02 96.05	97.15 98.26 99.52 100.87 102.26	105.08 106.49 107.90 109.30 112.11 114.91 117.70 120.47 125.91 131.18
Entropy J/(mol•K)	82.745 85.744 94.844 103.015	117.300 123.671 129.646	140.647 145.764 150.669	159.953 164.372 168.664 172.842	180.895 184.787 188.599	196.014 199.632 203.200 206.724 210.207	213.652 217.070 220.050 223.874 227.543 231.149	234.716 238.251 241.759 245.232 248.659 252.026	255.319 258.528 261.649 264.521 276.083 281.419 286.562 296.382 305.708
Enthalpy	974.1 1256.9 2096.3 2953.1 3808.9	4665.9 5526.2 6391.8	8147.5 9041.2 9947.5 10867.6	11802.4 12752.7 13718.9 14701.3	15700.1 16715.5 17747.6 18796.7 19863.2	20947.6 22050.8 23173.8 24317.7 25483.7	26672.9 27885.4 28974.6 30408.8 31821.5 33245.8	34690.1 36157.6 37648.2 39159.0 40684.0	43746.7 45271.0 46785.1 48287.8 51263.1 54210.9 57145.2 60076.8 65966.6
Internal Energy J/mol	16.8 275.7 1122.1 1965.6	3651.1 4497.2 5348.4	7073.8 7951.6 8841.5 9744.5	10661.7 11593.5 12540.4 13502.6	15473.3 16481.8 17505.9	19601.7 20674.4 21764.6 22873.1 24000.7	25148.0 26314.6 27353.3 28731.6 30082.2 31437.2	32803.9 34184.5 35578.1 36981.3 38388.5	41190.8 42576.5 43949.1 47398.0 47998.4 50663.1 55379.2 55979.1 61346.7
Sotherm Sotherm Derivative MPa•m3/kg	3.15424 3.07922 2.85211 2.64881	2.29501 2.13831 1.99229	1.72679 1.60534 1.49048 1.38169	1.27855 1.18074 1.00009	.91688 .83821 .76397 .69404	.56682 .50935 .45587 .40632 .36060	.31864 .28035 .24567 .21451 .18679	. 14146 . 12376 . 10931 . 09803 . 08973	.08075 .07915 .07915 .07984 .07884 .08582 .09042 .09565 .10707
isochore Derivative MPa/K	3.112792 3.029775 2.781497 2.563855		1.649674 1.539090 1.436475 1.340912	1.251629 1.167977 1.089404 1.015437	.879766 .817419 .758380	.649396 .599116 .551468 .506350	.423405 .385473 .349855 .316532 .285491	.230239 .206034 .184122 .164513 .147192	.119086 .107961 .098473 .090370 .077404 .067586 .053901 .044962 .038716
7	1.32414 1.28452 1.17170 1.07966	.93885 .88394 .83665	75966 72805 70013 67536	.65333 .63372 .61624 .60068	.5447 .54640	.53958 .53400 .52964 .52650 .52461	.52402 .52479 .52703 .53084 .53638	.55330 .56501 .57901 .59526 .61351	.65405 .67515 .69611 .71654 .75510 .82171 .84973 .89620 .93211
i†y kg/m3	.73703E+03 .73403E+03 .72423E+03 .71452E+03	.69527E+03 .68571E+03 .67617E+03	.65710E+03 .64753E+03 .63792E+03 .62825E+03	.61850E+03 .60866E+03 .59871E+03 .58863E+03	.57840E+03 .56799E+03 .55740E+03 .54659E+03	.52422E+03 .51261E+03 .50069E+03 .48841E+03	.46268E+03 .44917E+03 .43517E+03 .42068E+03 .40566E+03	.37407E+03 .35759E+03 .34083E+03 .32399E+03 .30737E+03	27605E+03 26185E+03 24878E+03 22686E+03 21612E+03 19887E+03 17218E+03 17218E+03 15774E+03
Density mol/L	.1671E+02 .1665E+02 .1642E+02 .1620E+02	1577E+02 1555E+02 1533E+02	• 1490E+02 • 1468E+02 • 1447E+02	. 1403E+02 . 1380E+02 . 1358E+02 . 1335E+02	.1512E+02 .1288E+02 .1264E+02 .1240E+02	.1189E+02 .1162E+02 .1135E+02 .1108E+02	. 1049E+02 . 1019E+02 . 9868E+01 . 9540E+01 . 9199E+01	.8483E+01 .8109E+01 .7729E+01 .7347E+01 .6970E+01	.6260E+01 .5938E+01 .5542E+01 .5371E+01 .4901E+01 .4182E+01 .3905E+01 .3463E+01
Temp.	86.951 90.000 100.000 110.000				250°000 270°000 280°000 290°000				470,000 480,000 520,000 520,000 540,000 560,000 560,000 660,000

()																																
Dielectric Constant	2.09623 2.09004 2.06900 2.04873	2.02912 2.01004 1.99141	1.97315	1.93752	1.90269	1.86832	1.83410	1.81696	1.78244	1.74741	1.72963	1.71163	1.67487	1.65606	1.63693	1.59764	1.57745	1.53590	1.51476	1.49325	1.44983	1.42822	1.40697	0000000	0.000000	0.00000	000000	0.00000	0.00000	0.00000	0.000000	0.00000
Vel. of Sound m/s	2066 2047 1982 1921	1805 1749	1695	1588	1484	1381	1280	1250	1130	1081	985	938	846	801	758	676	616	595 561	530	500	415	425	406	377	368	361	351	351	352	356	378	391
Fugacity/ Pressure Ratio	.81091E-10 .22941E-09 .52430E-08 .64879E-07	.50865E-06 .28146E-05 .11874E-04	.40401E-04	.28759E-03	.12808E-02	.41088E-02	.10386E-01	.15400E-01	.30291E-01	.40559E-01	.67270E-01	*83857E-01	.12335E+00	.14611E+00	107185400	.22506E+00	.25457E+00	. 28514E+00	.34763E+00	.37908E+00	.41041E+00 .44132E+00	.47158E+00	.50109E+00	. 55715E+00	.58352E+00	.60871E+00	677086400	.71702E+00	.75279E+00	9	.85892E+00 .88220E+00	.91697E+00
Cp J/(mol•K)		85°.04 86°.04 86°.66	87.34 88.08	88°90 89°80	90.79	93.04	95.71	97.23	100.66	104.66	106.90	109.30	114.61	117,49	120.47	125.58	151.44	138,64	139.86	141.57	145,38	7	148.47	60.0	149,91	149.63	149.17	147.51	-	9 +	149.16	154.42
Cv J/(mol•K)	62.34 62.20 61.79	61.21 61.20	61.29 61.46	61.71 62.06	62.49	63.63	65,17	65.10 67.14	68,30	71.01	72.56	74.25	78.07	80.16	82.55	85.71	110.66	95.97	96.23	97.03	98.12	100.72	102.13	105.02	106.47	107.92	112.22	115.06	117.87	120.65	0 0	136.40
Entropy J/(mol•K)	85.583 94.681 102.848	117.126 117.126 123.493	129.463	140.453	150.462	159.730	168,421	176.648	180.612	188,282	192.002	195.654	202.787	206.278	209.724	216.496	219.422	281 • 677	230,302	233.777	240,609	243,972	247,294	255.787	256.943	260.032	263.031	274.459	279.819	84.99		313.279
Enthalpy J/mol	1095.7 1342.5 2201.7 3058.1	4770.1 5629.7	6494.7 7367.1	8248.7 9141.2	10046.2	11897.9	13809.9	15785,2	16796.9	18869.0	19929.7	21007.5	23216,8	24350.1	25505.8	27873.8	28942.9	31738.2	33130.0	34536.8	37406.3	38869.0	40347.1	43333.7	44833.0	46330.9	50798.2	53754.0	56702.1	9652.	71596.1	77713.5
Internal Energy J/mol	19.5 262.1 1106.7 1948.4	2/88°8 3629°9 4473°8	5322.6 6178.3	7042.8	8804.5	11545.6	12488.1	14417.9	15405.2	17424.2	18456.1	19503.2	21644.7	22740.5	27087 8	26132.8	27150.4	28504 • 7	31152.3	32485.1	35183.8	36548.8	37920.9	40673.0	42045.9	43413.2	44//4°0	50160.8	52839.8	St C	66455.4	72097.1
Isotherm Derivative MPa·m3/kg	3.17211 3.10177 2.87486 2.67182	2.31865 2.16232	2.01669 1.88030	1.75203	1.51664	1.20831	1.11604	.94587	.86766	.72436	62669	. 59793	.48766	.43836	• 59285 35103	.31279	.27804	.21860	.19370	.17188	13714	.12404	.11361	86660	.09621	.09402	09268	. 09621	.09963	.10374	.12428	,13545
sochore Derivative MPa/K	3.113962 3.036301 2.788675 2.571548	2.206273 2.050343	1.908510	1.659349	1.351454	1.262483	1.100935	.957971	.892488	.772040	•716609	.664122	.567389	.522914	480912	.404073	.369136	. 306036	.277808	.251751	.206011	.186253	.168510	.138773	.126558	.115908	.091558	.079980	606020	.063652	.045304	.039740
7	1.48559 1.44381 1.31689 1.21334	1.05489 .99309	.93985 .89359	.85312	.78600	•73317 •71098	.69117	.65777	.64378	.62058	.61115	.60308	.59084	.58662	58200	.58165	.58267	.58908	.59463	.60187	.62166	.63423	.64845	.68087	•69836	,71616	76833	.80030	.82951	.85597	.93679	.96499
sity kg/m3	.73748E+03 .73468E+03 .72493E+03 .71527E+03	./U>68E+U> .69614E+03 .68664E+03	.67717E+03 .66771E+03	.65825E+03	.63925E+03 .62968E+03	.62005E+03	.60053E+03	. 58055E+03	.57034E+03	.54941E+03	.53864E+03	.52766E+03	.50493E+03	.49315E+03	48105E+U3	.45591E+03	.44282E+03	.42930E+U3	.40137E+03	.38687E+03	.35713E+03	.34210E+03	.52/16E+03	.29832E+03	.28479E+03	.27205E+03	.23894F+03	.22090E+03	.20551E+03	. 19229E +03	.15441E+03	.14133E+03
Density mol/L		. 1579E+02 . 1557E+02 . 1557E+02	.1536E+02	.1493E+02 .1471E+02	.1450E+02 .1428E+02	.1406E+02	-	.1359E+02	• 1293E+02	.1246E+02	.1221E+02	.1197E+02	.1145E+02	•1118E+02	. 109 1E+02	. 1034E+02	.1004E+02	.9423E+01	.9102E+01	.8773E+01	.8099E+01	•7758E+01	. /419E+01	.6765E+01	.6458E+01	.6169E+01	. 5419F+01	.5009E+01	.4660E+01	.4361E+01	.3501E+01	.3205E+01
Temp.	87.136 90.000 100.000 110.000	130.000	150.000 160.000	170.000 180.000	190.000	210,000	230,000	250.000	260,000	280,000	290.000	300,000	320,000	330,000	350,000	360.000	370,000	390,000	400,000	410.000	420,000	440.000	450,000	470.000	480.000	490.000	520,000	540.000	560.000	580.000	660.000	700°000

Propane Isobar at P = 20 MPa

Meark Mearah / Mear Mearah / Meark Meark Meark Meark Meark Mearah / Meark Mearah / Meark Mearah / Mearah / Mearah / Meark Mearah / Meark Mearah / Meark Mearah / Meara					Isotherm	Internal					Fugacity/	44	
7.75752E-0. 16667. 3.11520. 3.1900. 222. 12174. 85.796 62.41 85.79 62.42 84.05.228E-0. 2023. 7.75752E-0. 14612. 2.779595. 2.68760. 1931. 4.168. 2.726595. 61.87 84.05. 61.87 84.05. 61.87 84.05. 61.81 86.05. 61.87 84.05. 61.81 86.05. 61.87 84.05. 61.81 86.05. 61.81 8		ısity kg/m3	Z	i ve	Derivative MPa.m3/kg	Energy J/mol	Enthalpy J/mol	Entropy J/(mol·K)		Cp J/(mol•K)	Pressure Ratio	nd	Dielectric Constant
7706024-03 1,46102 2,2795655 2,68970 1931,4 2163,2 102,465 6 16187 644.6 5,4618(E-0.8 1988) 6 1,46182(E-0.8 19	3E+02 7E+02	.73793E+03	1.64617	3.042844	3,12432	22°2 248°8	1217.4	82.796	62.41	3.92	92212E 24238E	2071	2.09685
67006F-05 1706 2.21470 2.4422 27574 275.316 61.38 65.45 5185E-06 61656 61776 61776 61776 61776 61775 617	SE+02	.72563E+03	1.46182	2.795855	2.89760	1091.6	2307.0	94.519	61.87	4.46	54618E	1988	2.07013
.68790E-053 1.17066 2.059104 2.18624 4450.7 573.4 10.5956 61.20 86.60 11932E-04 1755 6657E-05 1.02756 1.02759 2.04099 527.2 6597.7 1199.225 61.20 86.60 11932E-04 1755 6657E-05 1.02756 1.02759 2.04099 527.2 6597.7 1199.2 88.0 62.56 61.20 88.0 6275E-05 1596 6697E-05 1.02756 1.02759 1.02759 2.04099 527.2 6597.7 1199.2 88.0 62.56 61.20 88.0 6275E-05 1596 6697E-05 99131 1.02655 1.5259.0 1.0275	2E+02	.70648E+03	1.25119	2.386985	2.51087	2769.9	4018.2	110,112		5.43	51882E	1869	2.03043
CRADECTOR CANADA CANA	E+02	.69700E+03	1,17066	2.214720	2,54222	3608.9	4874.3	116.954	61.28	5,99	.28480E-05	1812	2.01144
6687EH-H. 2011 77040 6197-5 6140-26 61.75 68.80 0.14645E-03 6196 6783EH-H. 2012 6782B 16.66891 177040 6197-5 61.75 66.71 68.80 0.1465 61.95 6703EH-H. 2015 1.5687 1.6687 1.6687 1.6687 1.6687 1.678 66.12 66.66 6.758 6.75 <	3F+02	.67816E+03	1.04276	1.917559	2.04099	5297.2	6597.7	129.282	61.36	7.27	.40360E-04	1703	1.97476
6.6936EH-03 94628 1-66931 1-7771 7012_4 875_0, 0.102.05 61.78 88-80 224576E-02 5196 64055E403 5195 64055E403 64055E4	7E+02	.66877E+03	.99131	1.788049	1.90499	6150.5	7469.3	134.914	61.52	8.00	1 (1	1650	1.95693
. 64995EH-03 20066 15586E 15586E 150.256 165.05 65.0	5E+02	.65938E+03	.94628	1.668941	1.77714		8350.0	140.262	61.78	8.80	111	1598	1.93936
6.60555FC-0. 87156 1.54261 1.54261 8768.4 10165.2 190.258 62.56 90.65 .125746E-02 1495 10510519FC-0. 871056 1.551056 1.454651 1.54261 1.95471 9664.4 10165.2 190.2 190.2 191.7 1.25246E-02 1495 10510519FC-0. 81264 1.551056 1.45461 1.9505 1.45461 1.9505 1.45461 1.9505 1.45461 1.9505 1.4546 1.9505 1	1E+02	.64998E+03	.90663	1.558907	1.65657	0	9241.5	145,366	62,12	69°6	111	1546	1.92200
.62197E-03 .884040 .13561865 1.35263 119393.7 1995.10 64.42 94.11 .25246E-02 1444 119176E 1.25563 11939.7 1959.510 64.42 94.11 .25246E-02 1444 1150.5195.4 1190.6 61.25563 11939.7 1959.510 64.42 94.11 .55246E-02 1444 1190.6 1.25563 11939.7 1939.6 61.2593 11939.8 1939.5 11939.8 1	5E+02	.64055E+03	.87156	1.456851	1.54261		10145.2	150.258	62.56		111	1495	1.90481
0.000000000000000000000000000000000000	1E+02	.63109E+03	.84040	1.361865	1.43473	664.	11062.3	154.965	63.08		ш	1444	1.88775
00130E+03 76971 1,11206 1,499.0 1499.0 1499.0 1599.0 1	0E+02	.62157E+03	.81264	1.273185	1.33252		11993.7	159,510	63.70		0113E	1393	1.87077
	8E+0Z	.6119/E+03	0 /8 /86	1.190168	1.25565		12940.0	165.910	64.47		13 L	1545	1.85585
.85255E-0. 17248 .090900 .97450 14357.6 180.337 68.36 100.29 22.27E-0 1146 1955.5 17248 .09040 .89257 1639.7 180.337 68.35 100.217 .39131E-0 1146 1955.5 17248 .09040 .89257 1639.7 180.337 68.55 100.217 .39131E-0 1146 1955.5 17248 .09040 .89257 16355.6 1700.3 17248 .09040 .89257 16355.6 1700.3 17248 .09040 .89257 16355.6 1700.3 17248 .09040 .89257 16355.6 1700.3 17248 .09050 .227E-0 1146 1955.5 174.5 174.5 100.2 17.2 17.2 17.2 17.2 17.2 17.2 17.2 17	0E+02	. 00/20E+US	1/00/1	1 020010	1 05600	1245/05	12901.00	172 777	00.74		7000	1242	1.00000
\$57261E+03 717248 904904 89671 15329.5 16879.7 180.357 68.35 100.29 .29279E-01 1146 15524E-03 66615 .785294 .89471 15359.5 16903.7 180.357 68.35 100.29 .29279E-01 1146 .85244E-03 .66615 .785294 .76273 16.6528 18370.5 19998.9 191.677 72.61 106.29 .29279E-01 1004 1055241E-03 .66597 .762399 .62846 19309.5 191.677 72.61 106.25 .64785E-01 1004 10552 .2020E+03 .65800 .629111 .57164 20463.5 22159.2 191.677 72.61 106.25 .64785E-01 1004 10591 .25002E+03 .65800 .629111 .57164 20463.5 22159.2 191.677 72.61 106.25 .64785E-01 1004 10591 .25002E+03 .65800 .629111 .57164 20463.5 22159.2 191.677 72.61 106.25 .80655E-01 1004 10591 .25002E+03 .65800 .629111 .57164 20463.5 22159.2 191.677 72.61 106.25 .80655E-01 1004 10591 .25002E+03 .65800 .629111 .57164 20463.5 22159.2 191.677 72.61 106.25 .1182E-00 .8969 .49775E-03 .64603 .588655 .58865 .588655 .58865 .588655 .588655 .58865 .588655 .588655 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58865 .58866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .59866 .5986 .59866 .5	11F+02	58263E+03	12824 ACRCT	010600	07450	17357	15871 1	176 386	67.20		12675	1195	1.80308
\$65446+03 \$6986 \$84418 \$82331 \$6355-6 \$1903-7 \$184.198 \$6986 \$102.17 \$39131E-01 \$1038 \$5503E16-03 \$68615 \$182244 \$730318 \$6823 \$1705-7 \$1616-17 \$39131E-01 \$1038 \$5121E-03 \$68617 \$182244 \$730318 \$6828 \$170,57 \$16,51 \$17,50 \$104,57 \$1008-11 \$25002E+03 \$65897 \$67309 \$6244 \$10409-5 \$1000-7 \$1008-6	30F+02	57261F+03	71248	904904	89671	15330.5	16870.7	180.337	68,36		2021C	1146	1.78606
\$52211E+03 \$68615 \$78294 \$75420 \$17345-9 \$8943-3 \$17,976 \$17,976 \$10,418 \$5041E-01 \$10541 \$5201E+03 \$66597 \$78518 \$78294 \$75420 \$17345-9 \$18943-3 \$17,976 \$17,616 \$17,616 \$17,616 \$17,616 \$17,616 \$17,616 \$17,617 \$17,616 \$17,617 \$17,616 \$17,617 \$17,616 \$17,617 \$17,618 \$17,616 \$17,617 \$17,618 \$17,616 \$17,617 \$17,618 \$17,617 \$17,618 \$1	75F+1)2	56244F+03	69850	843418	80301	16335.6	17903.7	184. 198	60°50		301315	1000	1-76894
\$4161E+03 \$67534 \$730318 \$68928 \$1870.5 \$19984.9 \$11,677 \$2,61 \$106.35 \$64785E-01 \$1004 \$5000E+03 \$6597 \$6537 \$68928 \$1870.5 \$19984.0 \$2,61 \$1004 \$1004 \$5000E+03 \$6597 \$67320 \$67840 \$2182.2 \$2182.2 \$111,14 \$9618E-01 \$98 \$5000E+03 \$6597 \$67860 \$5186 \$2182.2 \$2182 \$111,14 \$9618E-01 \$98 \$4975E+03 \$6403 \$52865 \$46964 \$2182.2 \$2182 \$111,14 \$9618E-01 \$98 \$4950E+03 \$6419 \$2200	10F +02	55211F+03	68615	785294	75420		18943.3	187.976	71,06		50941F	1051	1.75170
\$5092E+03	28F+02	541615+03	67534	730318	68928	18370.5	10000	191,677	72.61		787E	1001	1-73431
\$52002E+03 \$6580 \$629111 \$77164 \$20452-2 \$19.880 \$76.14 \$11.14 \$9618E-01 \$13.5 \$52002E+03 \$6590 \$6515 \$82596 \$1872 \$2155.2 \$2364 \$11.14 \$9618E-01 \$13.5 \$96896E+03 \$64136 \$632596 \$46964 \$2265.2 \$202.39 \$8.11 \$11.14 \$9618E-01 \$13.5 \$48596E+03 \$64199 \$497197 \$42426 \$2552.6 \$209.272 \$225 \$110.34 \$1632E+00 \$69 \$4471E+03 \$6376 \$42742 \$2695.1 \$12.640 \$84.42 \$12.1403E+00 \$4711E+00 \$452E+00 \$452E+00 \$4451E+00 \$452E+00 \$4451E+00 \$452E+00 \$4451E+00 \$44451E+00 \$4	4F+02	53092F+03	66597	678309	62846	19409.5	71070-7	195,310	74.30		ROKREE	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.71676
\$0890E+03 .65136 .582596 .51873 21552.2 202.394 78.11 113.76 .11852E+00 869 .4895E+03 .64603 .53655 .46644 .2216.52 .202.394 .78.11 113.76 .11852E+00 869 .4895E+03 .646199 .497197 .42428 .2516.2 .202.34 .202.10 .1892E+00 .784 .4895E+03 .64999 .497197 .42428 .23655.1 .212.40 .81.43 .115.76 .11852E+00 .856 .4895E+03 .65370 .236464 .20568.0 .218.84 .222.56 .218.81 .124.08 .2198E+00 .743 .4495E+03 .63760 .38702 .2786 .2805.2 .218.81 .222.10 .18924+00 .2495 .44095E+03 .63760 .274845 .2806.4 .3505.2 .225.56 .6609.4 .26696.0 .218.81 .2409.4 .27866.0 .27876-0 .27876-0 .27876-0 .27876-0 .278776-0 .278776-0 .27876-0 .27	79E+02	. 52002E+03	65800	.629111	.57164	20463.2	22159.2	198.880	76.14		98618E-01	913	1.69901
49755E+03 64603 538655 46964 22616.9 24389.4 205.858 80.20 116.51 14031E+00 826 48956E+03 64199 48718 5252.6 209.272 82.35 116.51 14031E+00 743 4806E+03 63776 42428 23717.8 5253.2 28872 212.640 85.71 124.08 21598E+00 743 46200E+03 63776 421442 53636 28922.5 218.851 110.64 149.71 24451E+00 647 44605E+03 63760 28746 29607.6 27876.5 215.970 85.71 124.08 21598E+00 747 42699E+03 63780 28784.6 29605.4 316.65.0 222.56.2 96.94 15.4431E+00 647 42409E+03 63760 227407 20605.4 316.25.3 28442E+00 747 747 747 747 747 747 747 747 747 747 747 747 747 747 747<	4E+02	. 50890E+03	.65136	582596	51873	21532.2	23265.2	202 394	78,11		11852F+00	869	1.68106
48596E+03 64199 -497197 -42428 23717-8 25522.6 209.272 82.35 119.34 16392E+00 743 -4711E+03 63792 -458148 -38253 244249 2596.6 2715.976 84.21 122.10 1892E+00 743 -47011E+03 -63776 -421442 -38429 2596.6 27876.5 1215.970 85.71 124.08 -21598E+00 743 -4496200+03 -63776 -231442 -38929.2 28929.5 215.970 85.71 124.08 -21598E+00 745 -44095E+03 -63778 -32494 -2788 28929.5 215.970 124.18 124.18 124.28 124.18 124.18 124.18 124.18 124.18 124.18 124.18 124.18 124.18 124.28 124.18 124.18 124.18 124.18 124.18 124.18 124.18 124.28 124.18 124.18 124.28 124.18 124.28 124.28 124.28 124.28 124.28 124.28	8E+02	.49755E+03	.64603	.538655	46964	22616.9	24389.4	205.858	80.20		140315+00	826	1.66288
47411E+03 653923 458148 538253 24834.9 26695.1 212.640 84.42 122.10 18924E+00 743 44605E+03 65376 .3421442 .34429 2296.6.6 27876.5 218.81 110.44 149.71 .24418E+00 705 .44605E+03 .63776 .348142 .35429 2296.6.6 27876.5 218.81 110.44 149.71 .24418E+00 705 .44608E+03 .65413 .354844 .27788 28303.2 30321.4 222.56 96.94 136.70 .27371E+00 625 .44095E+03 .66413 .3248453 .24946 29605.4 31688.0 220.56 96.94 136.71 2441E+00 625 .44095E+03 .66779 .271234 .20160 32213.9 342.5 136.7 137.2 137.2 147.2 137.2 147.2 137.2 147.2 147.8 147.8 147.8 147.8 147.8 147.8 147.8 147.8 147.8 147.8 147.8)2E+02	.48596E+03	.64199	.497197	.42428	23717.8	25532.6	209.272	82.35		.16392E+00	784	1.64447
.46200E+13 .63776 .421442 .34429 25967.6 27876.5 215.97 85.71 124.08 .21598E+00 705 .44963E+03 .63760 .837025 .30945 25967.6 27876.5 215.97 124.08 .21598E+00 705 .44963E+03 .63760 .837025 .30945 28022.4 216.87 124.08 .21598E+00 647 .42609E+03 .64132 .324854 .27070 .22477 .2000 .22477 .22577 .22676 .22677 .22737E+00 .22737E+00 .22778 .22475 .22677 .22777 .227475 .22677 .22777 .22777 .22777 .22777 .22777 .22777 .22777 .22777 .22777 .22777 .22777 .22778	75E+02	.47411E+03	.63923	.458148	.38253	24834.9	26695.1	212,640	84.42		.18924E+00	743	1,62581
44965E+03 .63760 .389025 .30945 26968,0 28929,5 218,851 110,64 149,71 .24431E+00 647 .44965E+03 .63776 .389025 .30321,4 .222,562 96,94 156,70 .27371E+00 625 .42699E+03 .64132 .224863 .27494 29605,4 3168,69 3537E+00 625 .41095E+03 .64132 .224863 .22407 .2096,4 356,17 177.28 .3337E+00 655 .39760E+03 .65779 .22407 .2096,4 356,25 96,95 138,69 .3642E+00 555 .39760E+03 .65779 .22407 .2096,4 356,25 96,95 138,69 .36442E+00 557 .39760E+03 .65779 .22407 .2096,4 356,25 22,566 96,95 138,69 .36442E+00 557 .3840E+03 .65779 .22407 .2096,4 326,253 96,95 140,21 3247E+00 567 .3567EE+03 .65779 <	8E+02	.46200E+03	•63776	.421442	.34429	25967.6	27876.5	215.970	85.71		.21598E+00	705	1.60690
43690E+03 65878 535844 27788 28353.2 30321.4 222.562 96.94 136.70 27771E+00 625 42409E+03 64132 535844 27788 28353.2 30521.4 226.104 95.92 136.37 35055E+00 595 41095E+03 64529 224070 22407 22407 237.24 33597E+00 595 41095E+03 65070 271234 20160 32213.9 34432.1 235.975 96.95 136.87 33597E+00 597 39406E+03 65079 2271234 20160 32213.9 36.95 140.31 3987E+00 557 35406E+03 65759 2247501 18192 3350.5 34857.3 3753.5 440.31 358442E+00 577 35406E+03 65759 224751 16492 34857.3 3753.5 422.99 443.56 443.58 4445.72 445.72 445.81 100.06 443.58 4445.72 446.81 100.06 443.58 4445.41	:0E+02	.44963E+03	.63760	.387025	.30945	26968.0	28929.5	218.851	110.64		.24431E+00	647	1.58774
42409E+03 .64132 .524853 .24946 29665-4 31685-0 226.104 95.92 136.37 .30365E+00 595 .41095E+03 .64529 .297000 .22407 30906-4 31685-0 229.566 96.17 137.28 33397E+00 565 .4940E+03 .6579 .271534 .2016 32213-9 3432-1 187.28 33397E+00 565 .3840EE+03 .6579 .247501 .18192 35570-5 226-34 98.95 140.31 3548FE+00 510 .37041E+03 .66597 .22741 .16492 34857.3 3728.3 98.95 141.98 42504E+00 510 .37041E+03 .66597 .22741 .16492 34857.3 3728.3 42.928 141.98 42504E+00 510 .37041E+03 .66597 .22741 .16492 34857.2 3728.3 42.938 103.64 425.04 42.938 103.64 425.04 42.938 103.64 424.41 42.938 103.64 42	0E+01	.43699E+03	.63878	.354844	.27788	28303.2	30321.4	222.562	96.94		.27371E+00	625	1.56834
41095E+03 .64529 .227000 .22407 35052.5 222.566 96.17 137.28 .3339TF+00 565 .34760E+03 .65070 .271234 .20160 32213.9 34432.1 232.975 186.69 .3442E+00 557 .3840E+03 .65577 .271234 .20160 32213.9 345.33 96.95 186.69 .3442E+00 557 .3840E+03 .65597 .225741 .16492 34857.2 37238.3 28.03 140.31 3548F+00 455 .3567E+03 .66597 .225741 .16492 34857.3 37238.3 100.63 143.58 .45475E+00 455 .3567E+03 .66597 .225741 .16492 34857.3 37238.4 99.28 141.98 .45475E+00 453 .3567E+03 .66597 .17661 .18851 3758.4 4010.4 143.58 45477E+00 463 .3567E+03 .67592 .275.855 .44.5032.2 .255.638 104.619 47.08 5516.E+00	7E+01	.42409E+03	.64132	.324853	.24946	29605.4	31685.0	226.104	95.92		.30365E+00	595	1.54871
39400E+03 65070 27/124 20160 522134 54452-1 232.915 96.95 186.69 56442E+00 557 38400E+03 66579 -247501 -18192 33530-5 536.933 98.03 140.31 39487E+00 557 37400E+03 -66579 -247501 -18192 33530-5 37236.3 99.28 140.31 39487E+00 557 37502E+03 -66579 -226741 -15049 35193-3 3866-3 242.956 140.38 4857-3 460 485 45704E+00 485 45772E+00 485 45772E+00 485 45772E+00 485 45772E+00 485 45772E+00 485 4772E+00 475 47572E+00 475 4755 4745 4766-10 475 4756-10 475 4756-10 475 4766-10 475 4766-10 475 4766-10 475 4766-10 476 4766-10 476 4766-10 476 476 4766-10 476 4766-10 476	9E+01	.41095E+03	.64529	• 297000	.22407	30905.4	33052.5	229.566	96.17			565	1.52890
35470E+03 35470 55826-9 256.535 98.03 140.31 559487E+00 510 37471E+03 36597 325741 16492 34857-3 37238-3 236.554 99.28 141.98 42504E+00 485 35774E+03 36653 242.938 100.63 143.98 42573E+00 463 3577E+03 36758 37538-7 40109-4 246.181 100.63 143.581 443 3578E+03 36956 171661 37538-7 40109-4 246.181 100.63 143.585 45473E+00 463 3596E+03 69956 171661 37538-7 40109-4 246.181 100.63 143.835E+00 443 3516A8E+03 77313 1561 11563 40245-4 4506-1 255.638 106.43 147.08 53962E+00 410 35376E+03 77276 1165 42959-7 45984-5 258.686 107.91 147.08 53962E+00 412 28002E+03 774245 11662	0E+01	• 59 / 60E+U5	0/059.	.2/1254	.20160	52215.9	54452.1	252.975	96.95		5442	557	1.50895
350741E+03 300997 350725+03 37530-09 37530-09 37530-09 423.58 45.01 48335E+00 463 35072E+03 68706 100.04 3666.3 242.938 100.63 143.58 45473E+00 463 34308E+03 68706 171661 12883 38889.9 41565.5 249.381 102.04 145.01 48333E+00 443 32963E+03 68706 17161 12128 40109.4 446.09 147.08 53962E+00 443 31648E+03 71313 157114 12128 40245.4 45032.2 252.535 104.96 147.08 53962E+00 412 30376E+03 72751 144151 1165 42959.7 45984.5 258.686 107.91 47.06 59156E+00 410 29158E+03 74243 1165 42959.7 45984.5 258.686 107.91 47.06 59156E+00 391 28002E+03 77443 11602.4 4764.7 261.67 109.37 148.05	19H+01	. 58405E +05	407/CO.	.24/501	16402	55550.5	55826.9	256.555	98.03	120	9487	510	1.48892
34308E+03	OF TO 1	25672F±03	10000°	205000	15040	2400700	C*0C7/C	200.600	100 62	141.90	4 Z 2 Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	400	1.40091
32935E-03	0F+01	34 308 F+03	68706	187897	13851	20192.9 77538 7	700000	242,930	100.00	00°C	454/2E+00 48383E+00	407	1 42042
30376E+03* (2773) ***17104*** (272.8) ***17104*** (272.8) ***17104*** (272.8) ***17104*** (272.8) ***17104*** (272.8) ***17104*** (272.8) ***17.80*** (272.8) ***1	7F +01	32963F+03	69956	171661	12884	38880 0	41565 F	240 381	102 40	- 0	512171700	756	00000
20158E+03* 72751 ***14151 ***11563 ***14602.7*** 74506.1 ***255.638 ***147.66 ***56511E+00 ***17.66 ***56511E+00 ***5752 ***5762 ***17.22490 ***17.66 ***5762 ***5762 ***17.22490 ***17.66 ***5762 ***	7F+01	\$1648F+03	71313	157114	12128		43030,0	252.535	104.96	000	53962	420	00000
1.29158E+03	8E+01	\$0376F+03	12751	. 144151	11563	41602.7	44506-1	255-638	106.43	7.66	56611	400	0-0000
1.25892E+03 75762 1022490 10908 44315-1 47464-7 261.677 109.37 148.05 66141E+0 375 1.25893E+03 .78782 .105605 .10712 47018-5 50424-6 267.482 112.29 147.89 .66141E+0 375 1.24053E+03 .81665 .092406 .10800 49713-8 53380-4 273.059 115.16 147.70 .70268E+0 375 1.22459E+03 .84540 .081963 .11044 52407-7 56334-7 278.431 118.00 147.78 .73991E+0 371 1.22459E+03 .86789 .073561 .11367 55108-8 59294-1 283.623 120.80 148.22 .77342E+0 373 1.8703E+03 .91039 .060978 .12169 60560.7 65253-8 293.559 126.26 149.91 87670E+0 389 1.77008E+03 .94495 .052101 .13123 66111.1 71296-6 303.004 131.51 91395E+0 401 1.5778E+0	2E+01	.29158E+03	74243	132654	11165	42959.7	45984.5	258-686	107.91	7.96	59156	391	0000000
1 -25893E+03 -78782 -105605 -10712 47018.5 50424.6 267.482 112.29 147.89 -66141E+00 375 1 -24053E+03 -81665 -092406 -10800 49713.8 53380.4 273.059 115.16 147.70 -70268E+00 372 1 -22459E+03 -84340 -081963 -11044 52407.7 56334.7 278.431 118.00 147.78 -73991E+00 371 1 -221072E+03 -86789 -073561 -11367 55108.8 59294.1 283.623 120.80 148.22 -77342E+00 373 1 -18793E+03 -91039 -060978 -12169 60560.7 65253.8 293.559 126.26 149.91 83060E+00 389 1 -17008E+03 -94495 -052101 -13123 66111.1 71296.6 303.004 131.51 152.32 87670E+00 389 1 -1578E+03 -97273 -045554 -14155 77445.7 312.048	0E+01	.28002E+03	.75762	.122490	10908	44315.1	47464.7	261-677	109.37	8.05	61593	384	0000000
-24055E+03 .81665 .092406 .10800 49713.8 53380.4 273.059 115.16 147.70 .70268E+00 372 .22459E+03 .84340 .081963 .11044 52407.7 56334.7 278.431 118.00 147.78 .73391E+00 371 .21072E+03 .86789 .073561 .11367 55108.8 59294.1 283.623 120.80 148.22 .77342E+00 373 .18793E+03 .91039 .060978 .12169 60560.7 65253.8 293.559 126.26 149.91 .83060E+00 380 .17008E+03 .94495 .052101 .13123 66111.1 71296.6 303.004 131.51 152.32 .87670E+00 389 .15578E+03 .97273 .045554 .14155 71784.3 77445.7 312.048 136.54 155.19 91395E+00 401	2E+01	.25893E+03	•78782	.105605	.10712	47018.5	50424.6	267,482	112.29	7.89	.66141E+00	375	0.00000
*22459E+03 *84340 *081963 *11044 52407*,7 56334*,7 278*,431 118*,00 147*,78 *73991E+00 371 *21072E+03 *86789 *073561 *11367 55108*,8 59294*,1 283*,623 120*,80 148*,22 *77342E+00 373 *18793E+03 *91039 *060978 *12169 60560*,7 65253*,8 293*,559 126*,26 149*,91 *83060E+00 380 *17008E+03 *94495 *052101 *13123 66111*,1 71296*,6 303*,004 131*,51 152*,32 *87670E+00 389 *15578E+03 *97273 *045554 *14155 71784*,3 77445*,7 312*,048 136*,54 155*,19 *91395E+00 401	5E+01	.24053E+03	.81665	.092406	. 10800	49713.8	53380.4	273.059	115,16	7.70	.70268E+00	372	00000000
*21072E+03 *86789 *073561 *11367 55108*8 59294*1 283*623 120*80 148*22 *77342E+00 373 *18795E+03 *91039 *060978 *12169 60560*7 65253*8 293*559 126*26 149*91 *83060E+00 380 *17008E+03 *94495 *052101 *13123 66111*1 71296*6 303*004 131.51 152*32 *87670E+00 389 *15578E+03 *97273 *045554 *14155 71784*3 77445*7 312*048 136*54 155*19 *91395E+00 401	3E+01	.22459E+03	.84340	.081963	.11044	52407.7	56334.7	278.431	118.00	7.78	,73991E+00	371	0000000
*18793E+03 *91039 *060978 *12169 60560,7 65253,8 293,559 126,26 149,91 *83060E+00 380	9E+01	.21072E+03	.86789	.073561	.11367	55108.8	59294.1	283,623	120.80	148.22	.77342E+00	373	0000000
.17008E+03 .94495 .052101 .13123 66111.1 71296.6 303.004 131.51 152.32 .87670E+00 389 .15578E+03 .97273 .045554 .14155 71784.3 77445.7 312.048 136.54 155.19 .91395E+00 401	2E+01	• 18793E+03	.91039	*060978	•12169	60560.7	65253.8	293.559	126.26		.83060E+00	380	0000000
•15578E+03 •97273 •045554 •14155 71784.3 77445.7 312.048 136.54 155.19 •91395E+00 401	7E+01	.17008E+03	.94495	.052101	.13123	661111.1	71296.6	303.004	131.51	2	.87670E+00	389	0000000
	33E+01	.15578E+03	.97273	.045554	.14155	71784.3	77445.7	312.048	136.54	S	.91395E+00	401	0000000

(Continued)

Table 21.

Table 21. (Continued) Propane Isobar at P = 25 MPa

	Dielectric Constant	2.09840	2.07291	2.05295	2.03364	9965	9787	9611	1.94386	1.92681	1.89327	1.87669	1.86021	1.845/8	1.81101	1.79462	1.77820	1.76173	1.72050	1.71188	1.69508	1,67818	1.66119	1.64409	1.60965	1.59232	1.57496	1.54022	1.52293	1.50575	1.48874	0000000	00000	00000	00000	000000	0.00000	000000	0000000	000000
Vel. of	Sound m/s	2082	2004	1944	1887	17771	1724	1672	1621	1571	1471	1423	1374	1526	1232	1185	1139	1094	1050	9001	922	881	842	805	713	969	668	641	589	266	545	507	491	4//	454	438	428	422	419	423
Fugacity/	_	.13174E-09	.62944E-08	.74815E-07	.56723E-06		1 1 1 1	.11775E-03	. 28825E-03	*6295/E-US	.22932E-02	.39296E-02	•63537E-02	.9//11E-02	.20395E-01	.27967E-01	.37244E-01	.48331E-01	.61294E-01	.92879F-01	•11142E+00	.13171E+00	.15369E+00	.17727E+00	-22863E+00	.25612E+00	.28420E+00	34154F+00	.37048E+00	.39933E+00	.42793E+00	.48395E+00	.51110E+00	• 55/56E+00	.58808E+00	.63510E+00	.67849E+00	./1824E+00 .75447E+00	.81730E+00	.86888E+00
	Cp J/(mol•K)	83.88	, M	00	85°33	86.46		87.80			91.35		93.64	94.94	97.86	99.50	101.26	103, 15	105.17	109.63	112,05	114.58	117.16	119.64	146.60	133,23	132,51	135.02	135.27	136,62	138.01	140.66	(142.94	144.71		7.0	148.74	150.85	153.49
	Cv J/(mol•K)	62.58	62.05	61.75	61.55	61.44	61.52	61.69	61.95	67.79	63.24	63.86	64.57	65.59	67.35	68.51	66.79	71.20	72.14	76.75	78.21	80.28	82.43	84.48	110.65	96.92	95.88	96, 10	97.92	99, 16	100,50	103.38	104.87	100.57	109-38	112.37	115,31	121.04	126.55	131.82
	Entropy J/(mol•K)	82.862	94.118	102.275		122.882	128.837	134.457	139.792	144 882	154.449	158.975	163,355	16/•605	175.758	179,679	183.508	187,251	190.914	198,028	201.491	204.898	208.251	211.552	217,609	221.233	224.679	228.039	234.579	237.777	240.935	247.128	250.167	255.165	259.037	264.740	270.269	280.835	290.821	300 .3 32 309 . 448
25 MPa	Enthalpy J/mol	1521.3	2570.5	3425.8	4280.0	5992.7	6855.5	7725.3	8603.8	10202 0	11307.6	12235.2	13177.1	14155.7	16091.2	17092.0	18107.4	19137.4	20182.0	22315.6	23405.5	24511.5	25634.2	26773.5	28952.4	30311.5	31638.4	34300.3	35646.6	37005.9	38379.1	41166.1	42578.8	44002.8	45457.1	49788.0	52718.6	58633.3	64623.4	70708.7 76906.8
0 -	Energy J/mol	29.6	1054.8	1890°1	2723.9	4394.6	5235.7	6083.1	6938.9	7804.5	9570.1	10471.9	11387.2	12516.1	14214.9	15184.6	16167.4	17163.3	181/2.1	20228-6	21276.9	22338.9	23415.1	24505.3	26576.9	27877.4	29142.1	31667.9	32939.8	34220.3	35510.1	38116.3	39431.7	40/04	43416.6	46097.1		54223.4	59730.3	65339.4 71070.5
Propane S	Derivative MPa•m3/kg	3.23489	2.95439	2,75210	2.56879	2.24568	2.10130	1.96622	1.83933	1 60670	1.49993	1.39873	1.30286	1.21205	1.04466	.96778	.89524	.82692	./62/5	. 64628	.59382	.54506	.49988	45816	.38463	.35253	,32336	.29697	.25198	.23310	20101	.18935	.17864	16225	. 15630	.14812	.14390	.14314	•14769	.15429
Sochore	Derivative MPa/K	3.118573	2.813802	2.598379	2.407115	2.080806	1.939935	1.811061	1.692570	1 401705	1.387348	1.299317	1.216975	1.159//8	999033	.934746	.874112	.816877	07879/	.663553	.618034	.575095	.534632	.496554	.427226	.395828	.366511	• 5592U5 • 513831	.290316	.268582	.248546	.213238	197797	170010	.159291	.139244	.122860	.098434	.081631	.069588
	7	2.04384	1.82298	1.67914	1.55965	1.37294	1.29882	1.23437	1,17791	1 00407	1.04486	1.00985	.97853	95044	.90262	.88234	.86418	.84797	85556	80970	.80005	.79183	.78498	.77944	.77218	.77040	.76983	. 77220	.77512	•77914	79034	.79740	.80532	82222	.83313	.85368	.87461	.91446	.94921	1.00277
	ity kg/m3	.73904E+03	.72733E+03	.71785E+03	.70845E+03	.68982E+03	.68057E+03	.67135E+03	•66215E+03	.05294E+U5	.63450E+03	.62523E+03	.61591E+03	. 60654E+U5	. 58758E+03	.57797E+03	56826E+03	• 55844E+03	.54850E+05	.52824E+03	.51790E+03	.50742E+03	.49680E+03	.48603E+03	.46408E+03	.45291E+03	.44163E+03	•45025E+U5 •41879F+U3	.40729E+03	.39576E+03	.58426E+U5	.36148E+03	.35031E+03	32866F±03	.31830E+03	.29869E+03	.28074E+03	.24999E+03	.22530E+03	.20532E+03
	Density mol/L	.1676E+02	.1649E+02	•1628E+02	.1607E+02	1564E+02	.1543E+02	.1522E+02	.1502E+02	1481E+UZ	• 1439E+02	.1418E+02	• 1397E+02	.15/5E+02 125/5E+02	1332E+02	.1311E+02	•1289E+02	• 1266E+02	1244E+02	.1198E+02	.1174E+02	.1151E+02	•1127E+02	.1102E+02	. 1052E+02	.1027E+02	.1001E+02	.9/5/E+01 .9497E+01	.9236E+01	.8975E+01	.8/14E+U1	.8197E+01	.7944E+01	7453E±01	.7218E+01	.6773E+01	. 6566E+01	.5669E+01	.5109E+01	.4284E+01
	Temp. K	87.781		110.000	120.000	140,000	150.000	160.000	170.000	180.000	200.000	210.000	220.000	230.000	250,000	260,000	270.000	280.000	290.000	310,000	320,000	330,000	340.000	350,000	370,000			400.000			440.000		470.000			520,000	540.000	580,000	620,000	700.000

Table 21. (Continued) Propane Isobar at P = 30 MPa

	ielectric Constant	991	564 587	677 823	017	251	96521	145	91491	.89855 88334	86624	024	431	258	675	093	925	338	749	564	5970	375	190	503	023	54894	3351	826	277	000	000	00000	000	000	00000	000	000	
		2.09991	2.07564 2.05587	2.0367	2.0001	1.9825	1.96	1.93	1.91	689	000	1.85024	1.83431	1.80	1.78675	1.77093	1.73925	1.72338	1.70749	1.67564	1.65	1.64375	1.61190	1,59603	1.58	1.54894	1.53	1.51826	0.00000	0.0000	0.00000	00000000	0.0000	0000000	000000	0.0000	0.00000	
	Vel. of Sound m/s	2093	2019	1904	1797	1745	1694	1595	1546	1498		_	1311		1177	1134	1050	1009	970	895	859	827	756	730	705	656	634	613	576	560	545	552	500	485	475	461	461	
	Fugacity/ Pressure Ratio	.19473E-09	.75497E-08	*64545E-06	.13776E-04	.45237E-04	*12555E-03	.65711E-03	. 12937E-02	.23539E-02	.40033E-02	.98411E-02	.14417E-01	.27782E-01	.36862E-01	.47678E-01	.74703E-01	.90903E-01	.10883E+00	. 14962E+00	.17236E+00	. 19639E+00	.24844E+00	.27558E+00	.30321E+00	.35929E+00	.3874E+00	.41544E+00	.44323E+00	.49760E+00	.52398E+00	.549/5E+00	.62265E+00	.66731E+00	. 70866E+00	1345	.86895E+00)
	Cp J/(mol•K)	83.85	84.33 84.76	85.24	86.33	86.95	87.65	89.18	90°01	91.04	93.24	94.48	95.82	98.83	100,51	102.31	106.28	108.46	110.75	115.57	117.89	119,39	130,95	130.05	130.37	132.28	133.48	134.75	137.33	138.57	139.77	140.90	143.90		147.08	151.19	154.05	
	Cv J/(mol•K)	62.74	\sim	61.72	61.61	61.68	61.85	62,44	62.87	63,39	64.72	65.54	66.46	68.65	69.93	71.33	74.55	76.37	78.32	82,51	84.55	85.80	96.96	95.90	96.11	97.91	99,13	100.47	103.35	104.84	106.35	10/8/	112.42	115.40	118.33	126.75	132.05	
ro	Entropy J/(mol•K)	82.930	95.725 101.875	109,289	122,457	128.403	154.012	144.413	149.276	153,951	162,823	167.054	171, 163	179.060	182,862	186.576	193.764	197,251	200.675	207.348	210,601	213,806	220,117	223.502	226.797	233, 199	236,325	239.409	245.452	248.422	251.352	254.246	262.710	268,173	273.495	288.672	298.212	
P = 30 MPa	Enthalpy J/mol	1976.3	2835.9 3688.6	4541.9	6252.4	7113.8	7981.9	9745.4	10643.7	11554.6	13417.0	14369.2	15335.6	17310.7	18319.1	19341.1	21426.1	22489.4	23566.9	25766.8	26889.5	28026.5	30367.3	31670.5	32972.0	35596.7	36925.4	38266.6	40987.3	2366	3758	45161.9	49435.5	52330.8	55257.7	64206.6	70310.6 76533.1	
at	Internal Energy J/mol	37.6	1019.3	2679.6	4340.7	5176.6	6018.7	7728.1	8598.3	9480.3	11282.0	12202.4	13135.9	15041.4	16012.9	16996.5	18999.7	20019.3	21051.1	23153.0	24223.2	25305.0	27527.3	28766.9	30001.6	32482.9	33734.8	34995.8	37545.4	38834.2	40131.9	41458.0	45402.5	48080.0	50782.8	59041.5	64684.9	
Propane Isobar	isotherm Derivative MPa•m3/kg	3.23717	3.01110 2.80920	2.62642	2.30464	2,16102	2.02676	1.78202	1.66996	1.56400	1.36872	1.27875	1.11358	1.03687	.96502	.89733	.77396	•71806	.66586	.57210	.53029	.49169	.42353	•39369	.36648	.31936	.29917	.28103	.25044	.23774	• 22662	.21697	.19575	. 18699	.18158	.17844	.18227	
	lsochore Derivative MPa/K	3.122306	2.831736 2.617439	2.427091	2,102229	1.961969	1.833666	1.606832	1.505926	1.412109	1.242855	1,166243	1.094333	.963091	.903123	.846572	.742867	.695355	.650536	.568475	.531016	.495809	.431799	.402829	.375770	.327062	.305245	.285006	.248930	.232926	.218169	.204580	.170057	.151519	.135930	.102288	.087285	
	7	2.43621	2.18254 2.00993	1.86650	1.64230	1.55323	1.47574	1.34789	1.29475	1.24741	1.16714	1.13303	1.10233	1.04974	1.02729	1.00710	.97277	.95834	94556	.92459	.91623	.90920	.89886	.89544	.89314	.89167	.89241	.89406	.89991	.90398	.90872	.91406	.93281	.94675	.96108	1.00195	1.02518	
	Density kg/m3	.74014E+03	.72901E+03 .71965E+03	.71037E+03	.69202E+03	.68292E+03	•67386E+03	.65580E+03	.64678E+03	•63776E+03	.61966E+03	.61056E+03	.60141E+03	. 58296E+03	.57364E+03	.56424E+03	.54521E+03	. 53557E+03	• 52584E+03	.50614E+03	.49616E+03	.48611E+03	.46582E+03	.45561E+03	•44537E+03	.42486E+03	.41463E+03	•40446E+03	.38436E+03	.37449E+03	.36477E+03	.34593F+03	.32802E+03	.31122E+03	.29563E+03	.25613E+03	.23515E+03	
	Dens mol/L	.1678E+02	.1653E+02 .1632E+02	. 1611E+02	.1569E+02	.1549E+02	• 1528E+02	.1508E+02	.1467E+02	• 1446E+02	.1405E+02	.1385E+02	. 1364E+02	. 1322E+02	.1301E+02	. 1280E+02	. 1236E+02	.1215E+02	• 1192E+02	.1148E+02	.1125E+02	•1102E+02	.1056E+02	.1033E+02	*1010E+02	.9635E+01	.9403E+01	.9172E+01	.8716E+01	.8492E+01	.8272E+01	.8056E+01 .7845F+01	.7439E+01	.7058E+01	.6704E+01	. 5808E+01	.5333E+01 .4934E+01	
	Temp.	88.241	100,000	120,000	140,000	150,000	160,000	180,000	190.000	200.000	220,000	230,000	240,000	260.000	270,000	280,000	300,000	310,000	320.000	340,000	350,000	360.000	380,000	390.000	400.000	420,000	430.000	440.000	460,000	470.000	480.000	500,000	520.000	540.000	580,000	620.000	660.000 700.000	

P = 35

Propane Isobar at

Dielectric Constant 2.10140 2.09868 2.07831 2.05874 2.03983 2.02150 2.00365 .88773 1.61379 0.00000 0.00000 .93592 .91967 .90361 .87199 .85637 .84085 .82541 .81004 .77945 .74900 .70353 .98622 96916 .95240 .79472 .73382 .71866 .68844 .67338 .65838 .64343 .62857 .58458 .57019 .55596 .54193 .52811 0000000 0000000 0000000 0000000 Vel. of Sound 2105 977 921 .29408E-09 .45906E-09 .27370E+00 .30098E+00 .66578E+00 .70828E+00 .87585E+00 13753E-02 24826E-02 Fugacity/ 10443E-06 ,75482E-06 15520E-04 -02 12847E+00 .14942E+00 .17188E+00 22075E+00 32857E+00 ,35642E+00 .38430E+00 41209E+00 43972E+00 49400E+00 52045E+00 62017E+00 74766E+00 39004E-05 50209E-04 3756E-03 \$2919E-03 .66969E-02 .10909E+00 9558E+00 .24693E+00 46706E+00 54636E+00 .57164E+00 81736E+00 70477E-03 14840E-01 .91320E-01 10182E-01 .28346E-01 37468E-01 .48297E-01 .75232E-01 Pressure 20844E-01 .60882E-01 Ratio 41945E Cv Cp J/(mol•K) J/(moi•K) 105.43 107.52 112.02 114.36 114.36 117.98 117.99 128.32 128.32 128.32 88.97 89.83 90.76 91.78 92.88 94.07 95.37 96.76 83.82 83.87 84.26 84.69 85.16 85.66 85.66 86.21 86.21 886.81 101.61 31.41 32.62 33.87 46.09 30.27 35.13 36.38 37,62 38.82 42,18 47.84 51.12 154.31 57.52 44.21 84.64 85.88 87.02 97.02 97.02 96.15 96.95 90.90 100.49 101.91 101.91 106.88 106.88 106.88 107.90 107.90 115.48 62.83 62.83 62.40 62.09 61.89 61.78 61.78 62.25 62.25 62.59 63.02 63.54 64.15 64.87 65.68 66.60 67.63 68.78 70.06 71.46 73.00 74.67 76.48 78.42 80.48 82.61 126.91 132.23 137.28 J/(mol·K) 174.596 196.535 199.928 203.260 206.533 83.001 84.262 93.338 101.481 108.889 115.706 122.042 127.978 133.578 143.957 148.808 153.470 157.965 178.473 212.915 219.144 222.486 225.735 228.918 2352.044 2359.123 238.158 241.152 244.108 247.027 249.912 252.762 162.312 185.942 Entropy 93.076 271.795 296.468 70,617 266.516 261,112 286,921 Enthalpy 4803.9 5656.9 6512.4 7372.4 8239.1 9114.0 9998.8 118094.9 12724.5 13659.2 39582.7 40927.6 42285.2 2128.6 2240.3 3097.3 3951.3 16545.6 18537.1 19552.5 20580.8 22676.4 23744.1 24825.8 28155.0 29143.8 31751.9 35622.0 36930.2 52117.6 55020.8 57960.3 63940.3 43655.2 70049.0 21622.0 5569.8 25921.6 27031.7 0465.4 4324.4 58250.4 16431.4 19253.3 13020 8 13958 5 14908 3 Energy J/mol 46.3 154.6 985.0 811.9 5120.0 5956.9 6801.5 7655.2 8519.4 9395.0 11182.7 16843.0 9829.9 20848.4 21878.7 22921.1 27228.1 28449.3 32107.0 33339.0 35830.5 47511.7 50202.8 52925.3 58462.3 64124°2 69915°7 2636.9 3461.9 4289.0 50883.0 σ Interna 0282.6 5869.9 8823.0 25040.9 25969.4 29664.9 54580.0 9640.6 42228.7 58360.7 40929 44853. Derivative MPa·m3/kg Sotherm 1.96138 1.84346 1.73220 .62704 3.32514 3.29364 3.06772 2.51699 2.36313 2.22018 2.08665 1.43333 1.34411 1.25966 1.17976 96576 90253 84315 78749 64168 49178 46133 43340 40784 38452 36328 03295 59970 56082 52490 34401 32657 31083 29670 28406 27280 26284 24642 23411 2,86613 21924 Derivative .630004 .529563 .436210 221620 198189 178102 .267903 .191778 .120367 .053272 .874693 .821871 .772050 .725059 .680744 562564 527720 494983 464261 435466 Sochore 3.126359 2,446908 599613 383305 359769 337816 317362 298325 248910 234749 160892 146137 122544 104888 091408 2,849638 2,636402 2,123378 .983673 .738422 930712 408509 264177 855881 MPa/K 1.03187 1.02460 1.01850 1.02585 1.02585 2.82341 2.78723 2.54056 2.33920 2.17183 2.03066 1.91010 1.16388 1.14195 1.12216 1.10436 1.08838 1.07409 1.01349 1.44820 1.39850 1.35386 1.31367 1.27739 1.21496 1.18814 1.06140 1.04410 63607 56595 .00287 .00594 .04038 .00447 .00327 .00427 1.09441 .80607 .50370 01095 .00654 .71551 .57864E+03 .56961E+03 .56053E+03 71226E+03 70317E+03 69416E+03 .54222E+03 .48620E+03 .42051E+03 .41132E+03 26050E+03 64089E+03 63206E+03 61437E+03 60549E+03 58763E+03 55140E+03 52370E+03 51438E+03 46732E+03 45789E+03 44848E+03 43910E+03 42977E+03 40224E+03 39327E+03 3844E+03 37575E+03 36723E+03 33509E+03 73999E+03 73066E+03 72141E+03 68520E+03 67629E+03 66741E+03 65856E+03 64972E+03 62323E+03 59658E+03 50502E+03 49562E+03 35075E+03 32034E+03 30653E+03 28175E+03 Density .1038E+02 .1017E+02 168 1E+02 1678E+02 1657E+02 1656E+02 1615E+02 1595E+02 1554E+02 1554E+02 1554E+02 1292E+02 1271E+02 .1103E+02 1166E+02 1145E+02 .9122E+01 .8918E+01 .8718E+01 8328E+01 7954E+01 7599E+01 493E+02 1453E+02 433E+02 373E+02 333E+02 312E+02 .1250E+02 230E+02 209E+02 .1188E+02 124E+02 .1060E+02 .9536E+01 ,7264E+01 473E+02 413E+02 1393E+02 353E+02 5907E+01 9746E+01 6389E+0 mo I/L 100,000 110,000 110,000 150,000 150,000 150,000 170,000 170,000 220,000 220,000 220,000 220,000 220,000 220,000 220,000 230,000 230,000 230,000 230,000 230,000 230,000 230,000 230,000 230,000 340.000 350.000 360.000 400.000 410.000 420.000 430.000 440.000 440.000 470.000 490.000 520.000 550.000 580.000 370.000 380.000 390.000 000.000 \times

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(Continued)	MPa
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Table 21.	Isobar
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Dielectric Constant	2.10286 2.10112 2.08093 2.06154	2.02469 2.02469 2.00704	1.97299	1.94024	1.89290	1.86221	1.81706	1.80219	1.75800	1.72885	1.71437	1.68562	1.65721	1.62921	1.61540	1.58824	1.56179	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000	0.00000	000000000000000000000000000000000000000	0.000000
Vel. of Sound m/s	2116 2111 2050 1993	1885 1834	1736 1688	1641	1504	1416	1288	1247	1129	1055	1019	953	969	834	811	767	727	708	675	660 646	633	502	576	564	538	534
Fugacity/ Pressure Ratio	.45043E-09 .59790E-09 .11701E-07	.45596E-05 .17833E-04	.15372E-03 .36372E-03	.77093E-03	.44796E-02 .71063E-02	.10743E-01	.29485E-01	.49867E-01	.77209E-01	.11140E+00	• 13092E+00	. 17453E+00	. 22353E+00	.27656E+00	.30387E+00	.35938E+00	.41520E+00	.44294E+00	3E+0	.52420E+00 .55037E+00	595E+0	.62520E+00	.71519E+00	•75567E+00	.82775E+00 .88864E+00	•93966E+00
Cp J/(mol•K)	83.79 83.82 84.21 84.63	85.57 86.10	87.32 87.32 88.02	88.78	91.50	93.72	97.78	99.34 101.02	104.72	108.89	111-13	115.55	141.83	127.04	127.20	128.83	7 1	133.58	134.84	156.09	8.5	140.86	145.16	7.1	150.85	157.74
Cv J/(mol•K)	63.04 63.00 62.57 62.25	61.93 61.93 61.92	62.15 62.40	62.74	64.29 65.00	65.82	68.91	70.19	74.79	78.53	80.59	84.73	110.85	96.02	96.22	97.99	100.54	101.95	104.91	105.45	109.48	112.54	118.52		127.05	
Entropy J/(mol•K)	83.073 83.887 92.957 101.095	115.307	133, 155	143.514	157.485	166.017	177.914	185,343	192.433	199.235	202.540	208.973	214.784	221.584	224.801	231.042	237.086	240.046	245.854	251.525	254.311	259,790	270.389	ι. Γ.	285.455	304.176
Enthalpy J/mol		5918.0 6772.5	8496.7 9370.1	10253.1	12971.7	14848.6	17763.2	18760.5	21826.8	23933.5	25006.6	27193.2	29283.5	31867.0	33137.5	35696.0	38294.7	59611°8 40941.3	42283.4	45658.0	46384.3	49178.4 52018.0		57823.9	63784.8 69889.1	76131.0
Internal Energy J/mol	55.6 125.3 951.9 1774.9	2292.0 3416.6 4239.1	5897.6 6737.1	7585.5	10195.1	11994.4	14783.8	15736.7	18660.6	20664.0	21682.5	23754.3	25721.3	28172.7	29373.7	31786.1	34229.3	35465.1	37967.1	40510.3	41797.1	44400.4	49720.9	52435.5	5/968.8 63638.7	69445.1
Isotherm Inte Derivative Ene MPa•m3/kg J/m	3.37046 3.35013 3.12426 2.92287	2.57451 2.42118	2.14594 2.02134	1.90413	1.59033	1.40825	1.17010	1.09928	.91044	.80298	.75440	66691	.59143	.52682	49824	.44782	.40549	.38/04	.35498	.32865	.31740	.29831	.27156	.26283	.24842	.24886
lsochore Derivative MPa/K	3.130696 3.108846 2.867496 2.655258	2.297278 2.144261	2.002028 1.877726 1.760698	1.652694	1.373094	1.216480	1.016099	.957078	.799648	.709097	.628621	.591847	.524681	.465371	.438432	.389547	.346757	. 309413	.292588	.262268	.248634	.224094	.184320	.168270	.142144	.106707
7	3.20555 3.17894 2.89710 2.66698	2.31429 2.17642	2.05/40 1.95375 1.86279	1.78243	1.59022	1.49251	1.37822	1.34695	1.26934	1.22886	1.21148	1, 18173	1.15793	1.13930	1.13172	1.11965	1.11127	1.10850	1.10453	1.10326	1,10343	1.10511		1.11737	1.12822	1,14875
ity kg/m3	.74228E+03 .74150E+03 .73227E+03 .72314E+03	.70514E+03 .69625E+03	.68/4/E+U5 .67865E+U3 .66992E+O3	.66123E+03 .65256E+03	.63527E+03 .62564E+03	.61800E+03 .60936E+03	.59203E+03	.58334E+03 .57462E+03	.55710E+03	. 53949E+03	.53065E+03	. 51292E+03	.49517E+03	.47746E+03	.46864E+03	.45113E+03	.43287E+03	.4255/E+05 .41696F+03	.40866E+03	.40048E+03	.38452E+03	.36917E+03	.34054E+03	.32735E+03	.50529E+05	.26382E+03
Density mol/L	. 1683E+02 . 1682E+02 . 1661E+02 . 1640E+02	.1599E+02 .1579E+02	.1539E+02 .1539E+02 .1519E+02	.1499E+02 .1480E+02	.1460E+02 .1441E+02 .1421E+02	.1401E+02 .1382E+02	.1343E+02	.1323E+02 .1303E+02	. 1263E+02	.1223E+02	• 1203E+02 - 1183F+02	•1163E+02	.1123E+02	.1083E+02	.1063E+02	. 1023E+02	.9839E+01	.9646E+01	.9267E+01	.9082E+01	.8720E+01	.8372E+01	.7722E+01	.7423E+01	.68/8E+01	.5983E+01
Temp.	89.159 90.000 100.000 110.000	130.000	160,000 170,000	180,000	210,000	230.000	260.000	280.000	300.000	320,000	330,000	350.000	370.000	390.000	400,000	420.000	440.000	450.000	470.000	480.000	200 000	520.000	560.000	580.000	000.099	700°000

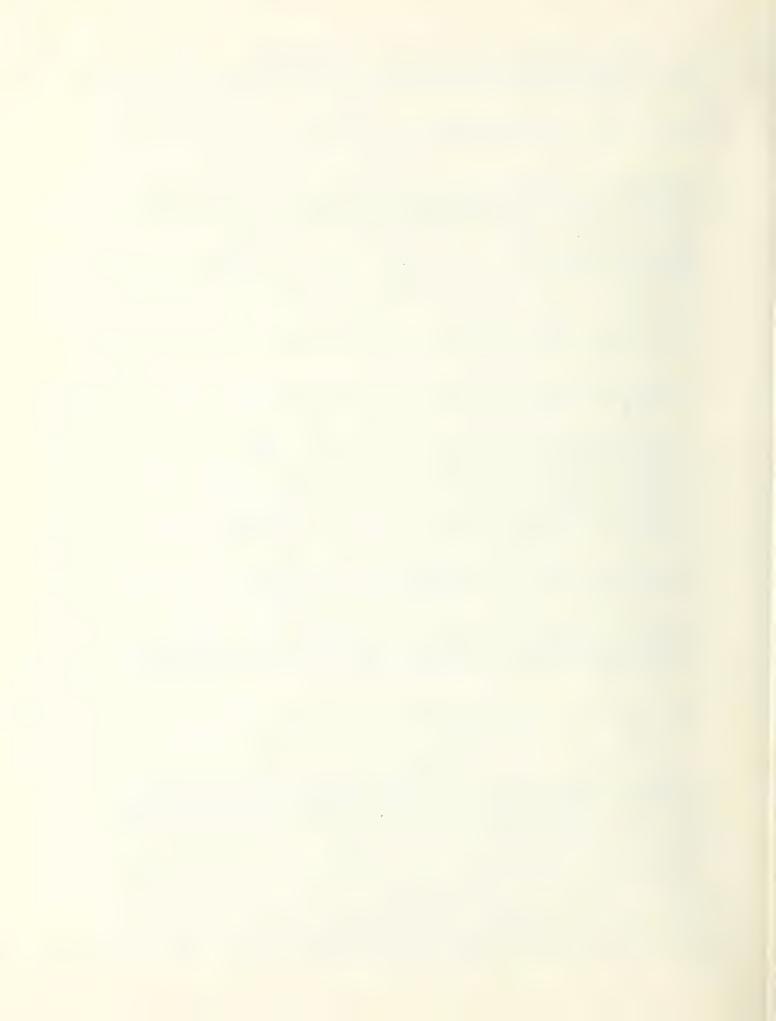
	Dielectric Constant	2.08602 2.08602 2.06697 2.04861 2.03084	2.01358 1.99676 1.98033 1.96425 1.94847	1,93296 1,91770 1,90266 1,88780 1,87313	1.84423 1.82999 1.81588 1.80188	1.77420 1.76052 1.74695 1.73349 1.72013	1.69378 1.68079 1.66793 1.65522 1.64267 1.63027	1,50400 1,59414 1,58247 0,00000 0,00000 0,00000 0,00000 0,00000	000000
	Vel. of Sound m/s	2139 2080 2025 1971	1871 1823 1776 1730 1685	1597 1554 1511 1470	1388 1349 1310 1272 1235	1198 1163 1129 1096 1054	1005 952 943 921 900 878 858	858 820 802 785 741 728 704	667 652 629 614 605
	Fugacity/ Pressure Ratio	. 10832E-08 . 19284E-07 . 19851E-06 . 13355E-05	.24543E-04 .75934E-04 .20010E-03 .46279E-03	. 18264E-02 . 32188E-02 . 53230E-02 . 83359E-02 . 12455E-01	.24742E-01 .33212E-01 .43384E-01 .55325E-01	.84586E-01 .10185E+00 .12077E+00 .14129E+00 .16334E+00	21161E+00 23779E+00 26495E+00 29266E+00 32084E+00 34932E+00	.40681E+00 .43549E+00 .46404E+00 .49234E+00 .52030E+00 .57483E+00 .60126E+00	.74606E+00 .78849E+00 .86448E+00 .92912E+00
	Cp J/(mol•K)	83.74 84.11 84.51 85.40	85.91 86.46 87.07 87.73 88.45		95.60 96.99 98.48 100.08	103.62 105.57 107.63 111.96	115.29 140.16 126.37 125.34 125.35 125.97	127.93 129.09 130.30 131.85 132.81 135.34 136.59 139.06	143.75 145.97 150.17 154.10 157.83
	Cv J/(mol•K)	63.32 62.88 62.56 62.34 62.23	62.21 62.27 62.43 62.68 63.01	63.95 64.56 65.26 66.07 66.99	68.02 69.16 70.43 71.82 73.35	75.02 76.82 78.75 80.80 82.91 84.93	86. 16 111.03 97.27 96.19 96.37 97.11	99.55 100.68 102.08 105.55 106.56 108.09 112.69	118.70 121.63 127.28 132.64 137.72
	Entropy J/(mol•K)	83.225 92.215 100.342 107.732	120.845 126.759 132.335 137.622	147.480 152.110 156.570 160.880 165.054	173.038 176.867 180.596 184.232 187.782	191.252 194.648 197.977 201.243 204.447 207.591	210.683 213.314 216.760 220.023 223.193 226.295 229.341	252,558 235,293 235,293 241,084 243,926 246,736 252,260 257,666	268.144 273.228 283.102 292.614 301.790
P = 50 MPa	Enthalpy J/mol	3038.1 3887.3 4739.6 5590.1 6440.7	7293.5 8150.3 9013.2 9883.8 10763.8	11654.3 12556.2 13470.4 14397.1 15336.6	17253.6 18230.7 19219.7 20220.5 21232.8	22256.6 23292.2 24339.7 25399.7 26472.3	28654.9 29616.2 30908.8 32165.0 33417.3 34673.5	5/211.4 38496.5 39793.3 41102.4 42424.3 43758.7 45105.8 46465.4 49222.0	54879.2 57776.4 63700.0 69786.1 76025.2
Isobar at F	Internal Energy J/mol	76.1 889.2 1704.7 2517.9 3330.6	4144.9 4962.7 5785.9 6616.1 7454.8	8303°2 9162°2 10032°4 10914°3 11807°8	13629.3 14556.8 15494.9 16443.3	18370.5 19349.2 20338.3 21338.2 22349.0 23370.8	24402.7 25296.8 26520.5 27705.9 28885.5 30067.3	52450.0 33655.8 34870.8 36096.4 37333.0 38580.6 41108.8 43680.9	48955.6 51652.1 57168.5 62838.8 68658.0
Propane 1s	sotherm Derivative MPa.m3/kg	3.46142 3.23712 3.03586 2.85425 2.68856	2.53604 2.39466 2.26283 2.13937 2.02334	1.91399 1.81074 1.71311 1.62073 1.53326	1.37205 1.29789 1.22778 1.16158	1.04032 .98500 .93304 .88432 .83872	.75631 .71925 .68476 .65273 .62300 .59546	. 52464 . 52464 . 50456 . 488607 . 45338 . 42583 . 40274	.35475 .35475 .33616 .32511
	lsochore Derivative MPa/K	3,140089 2,903031 2,692619 2,505368 2,337267	2.185247 2.046917 1.920368 1.804062 1.696740	1.597357 1.505044 1.419064 1.338792 1.263695	1.127249 1.065157 1.006736 .951720	.850998 .804901 .761419 .720405 .681721	.610857 .578454 .547933 .519198 .492158 .466724	.420540 .39928 .379402 .360787 .343313 .326912 .311520 .297074 .270791	.22/201 .209162 .179080 .155375
	7	3.95509 3.60589 3.31832 3.07919 2.87735	2.70484 2.55584 2.42597 2.31189 2.21101	2.12127 2.04104 1.96900 1.90406 1.84532	1.74362 1.69949 1.65923 1.62244 1.58878	1,55798 1,52976 1,50392 1,48025 1,45858	1.42061 1.40404 1.38892 1.37514 1.36261 1.35123	1.35160 1.32520 1.31565 1.30284 1.29746 1.29270 1.28850 1.28161	1.26581 1.26581
	i+y kg/m3	.74437E+03 .73541E+03 .72650E+03 .71767E+03	.70028E+03 .69170E+03 .68319E+03 .67473E+03	.65795E+03 .64963E+03 .64133E+03 .65306E+03 .62481E+03	.60835E+03 .60014E+03 .59194E+03 .58374E+03	. \$6737E+03 . \$5919E+03 . \$5102E+03 . \$4287E+03 . \$5473E+03	.51852E+03 .51046E+03 .50244E+03 .49446E+03 .48653E+03 .4786E+03	455156+03 455486+03 447916+03 4470446+03 425806+03 418656+03 411616+03 5397916+03	.3/209E+03 .36001E+03 .33757E+03 .31737E+03 .29928E+03
	Density mol/L	.1688E+02 .1668E+02 .1647E+02 .1627E+02 .1608E+02	.1588E+02 .1569E+02 .1549E+02 .1530E+02	. 1492E+02 . 1473E+02 . 1454E+02 . 1436E+02 . 1417E+02	.1380E+02 .1361E+02 .1342E+02 .1324E+02	. 128 7E+02 . 1268E+02 . 1250E+02 . 123 1E+02 . 1213E+02	1176E+02 1158E+02 1139E+02 1121E+02 1103E+02 1103E+02	. 1050E+02 . 1035E+02 . 1016E+02 . 998EE+01 . 9821E+01 . 9494E+01 . 9534E+01 . 9023E+01	.8164E+01 .8164E+01 .7655E+01 .7197E+01
	Temp. K		140.000 150.000 160.000 170.000	190.000 200.000 210.000 220.000 230.000		300.000 310.000 320.000 330.000 340.000	360.000 370.000 380.000 390.000 400.000 410.000	450,000 440,000 450,000 450,000 480,000 500,000 520,000	580°000 620°000 660°000 700°000

Table 21. (Continued)	Propage Isobar at P = 60 MPa

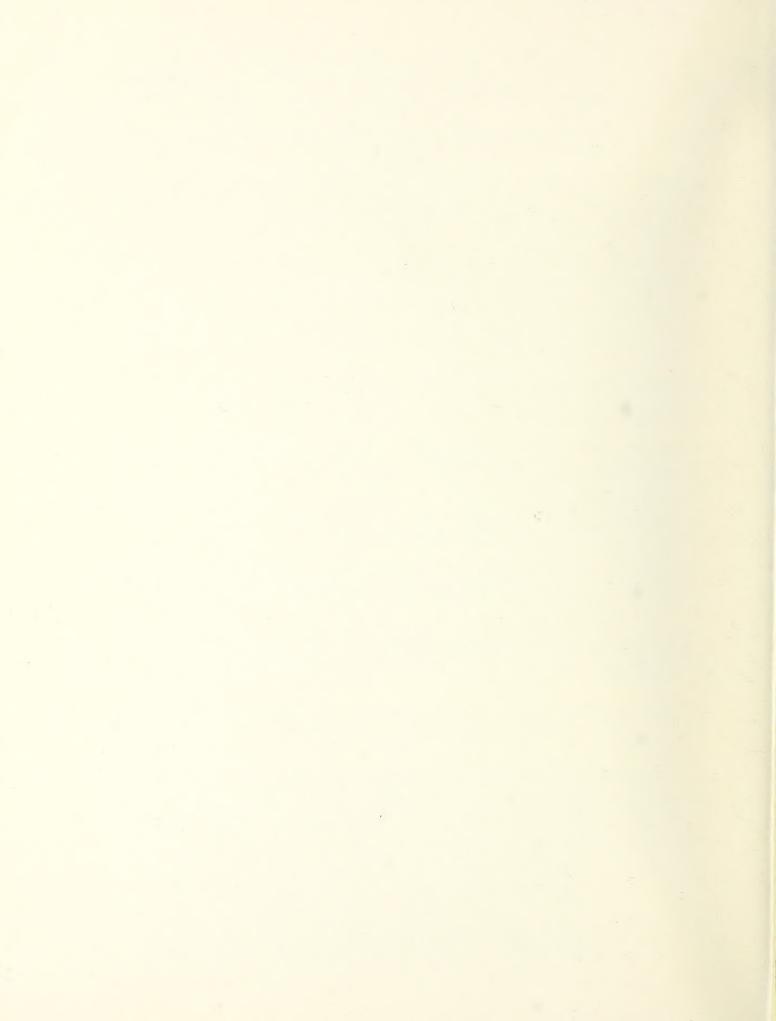
Dielectric Constant	2.09091 2.09091 2.07219 2.05416	2.01980 2.01980 2.00334	1.98729	1.95622	1.92631	8973	1.86920	1.84173	1.82822	1.80163	1.78854	1.77558	1.75006	1.73750	1.71279	1.70065	1.68866	1.66514	1.65363	1.63112	1.62013	1.60933	0.00000	0.00000	0.00000	0000000	0.00000	000000	0.000000	0.000000	
Vel. of Sound m/s	2162 2110 2056 2004	1906 1860	1814	1727	1642	1560	1481	1404	1367	1296	1261	1228	1164	1133	1078	1025	1017	776	956	918	006	883	851	836	823	786	765	73.1	705	686	
Fugacity/ Pressure Ratio	.26471E-08 .33005E-07 .32076E-06 .20571E-05	.35078E-03 .10534E-03	.27047E-03	.12447E-02	.40278E-02	. 10148E-01	.21268E-01	.29162E-01	.50271E-01	.78891E-01	.96018E-01	.11495E+00 .13559E+00	.15785E+00	. 18167E+00	.23349E+00	.26147E+00	. 29040E+00	.34968E+00	•37977E+00	.41006E+00 .44034E+00	.47049E+00	.50045E+00	.55941E+00	.58820E+00	.61647E+00	.69743E+00	.74794E+00	83973F+00	.91914E+00	.98673E+00	
Cp J/(mol•K)	83.69 84.02 84.40 84.82	85.75 86.28	86.85 87.49	88.17	89.75	91.61	93.81	95.04	97.82	101.03	102.81	104.70	108.81	110.95	114.19	139.02	125.20	124.12	124.72	126.66	127.81	129.02	131.54	132.83	134.11	137.92	140.39	142.80	149.58	153.76	
Cv J/(mol•K)	63.57 63.18 62.85 62.62	62.54 62.54	62.69 62.94	63.27 63.69	64.20 64.80	65,51	67.23	69,39	70.66	73.57	75.23	77.03	81.00	83.11	86.35	111.22	97.45	96.55	97.28	99,51	100.84	102.24	105.20	106.72	108.25	112.85	411	121,83	. 4	132.86	1
Entropy J/(mol•K)	83.384 91.494 99.612 106.992	120.084 125.987	131.550	141.846 146.651	151°264	159,997	168, 180	175.898	179,603	186.739	190.182	193,551	200.088	203,262	209.438	212.038	215,453	221.825	224 897	230.879	233.804	236,690	242.354	245.137	247,888	255,970	261,222	266.571	281.250	290,733	
Enthalpy J/mol	3643.5 4413.7 5265.0 6114.4	0965.7 7814.9 8670.0	9530.9 10399.3	11276.7	13063.0	14896.2	16778.6	18709.2	19691.9	21690.7	22706.6	23733.8	25822.9	26885.6	29047.0	29997.1	31278.2	33762.6	35006.5	37519.1	38791.5	40075.5	42680.9	44002.7	45337.4 46684.8		52201.2	57012.5		69875.3	
Internal Energy J/mol		4057.4 4867.4	5682 • 4 6504 • 3	7334.3	9023.4	10755.7	12533.0	14353.9	15279.9	17161.4	18116.7	19081.7	21042.2	22038.4	24062.1	24941.0	26149.3	28483.7	29650.3	32003.7	33194.2	34395.0	36829.8	38064.4	39310.5	43118°4	45714.4	48355.4 51040.5	56538.8	62201.9	
Isotherm Derivative MPa.m3/kg	3.55272 3.34971 5.14824 2.96673	2.64941 2.50871	2,37768	2.13999 2.03159	1.92929	1.74111	1.57246	1.49477	1,35163	1.22369	1.16504	1.10976	1.00878	.96283	.87937	.84160	.80631	.74265	.71404	.66262	.63959	.61820	.57992	. 56284	.54702	.50627	.48400	46507	.42436	.40752	
sochore Derivative MPa/K	3.150248 2.938257 2.729474 2.543493	2.225236 2.087624	1.961707	1.739170	1.548433	1.383070	1.238433	1-1/2//5	1.053024	.946852	.898277	.852451	.768382	•729844	.659117	.626700	.596105	.540002	.514315	.467251	.445719	.425422	.388258	.371260	.355238	.312456	.287828	. 246315 . 246315	.213175	.186526	
7	4.68569 4.30927 3.96434 3.67742	5.45517 5.22803 5.04903	2.89291 2.75568	2.63422	2,42925	2,26359	2, 12762	2.06861 2.01469	1.96532	1.87842	1.84014	1.80488	1.74236	1.71466	1.66540	1.64353	1.62329	1.58726	1.57123	1.54268	1,52998	1.51822	1.49727	1.48794	1.47931	1.45704	1.44476	1.42418	1.41004	1.39832	
sity kg/m3	.74640E+03 .73845E+03 .72973E+03 .72111E+03	./1258E+03 .70414E+03 .69578E+03	.68750E+03	.67112E+03	.65497E+03	.63901E+03	.62319E+03	.60750E+03	. 59969E+03	.58416E+03	.57644E+03	.56874E+03	.55344E+03	• 54585E+03	.53077E+03	.52330E+03	.51588E+03	.50121E+03	.49397E+03	.48680E+03 .47971E+03	.47270E+03	.46578E+03	.45220E+03	.44555E+03	.43901E+03	.42000E+03	.40788E+03	- 59522E +U5	.36400E+03	.34481E+03 .32735E+03	
Density mol/L	.1693E+02 .1675E+02 .1655E+02 .1635E+02	.1597E+02 .1597E+02 .1578E+02	.1559E+02	.1522E+02	.1485E+02	.1449E+02	.1413E+02	.1378E+02	.1360E+02	.1325E+02	•1307E+02	. 1290E+02	.1255E+02	• 1238E+02	.1204E+02	.1187E+02	.1170E+02	.1137E+02	.1120E+02	. 1088E+02	.1072E+02	.1056E+02	.1025E+02	.1010E+02	.9955E+01	.9524E+01	.9250E+01	.8985E+01	.8255E+01	.7819E+01 .7423E+01	
Temp.	90°987 100°000 110°000 120°000	140.000	160.000	180.000	200.000	220.000	240.000	250,000	270,000	290,000	300,000	370.000	330,000	340.000	360,000	370.000	380,000	400.000	410.000	420.000	440.000	450,000	470.000	480.000	500,000	520,000	540.000	580-000	620,000	660.000 700.000	

Dielectric Constant 2.09562 2.07720 2.05948 2.04235 2.02575 2.00962 .97855 .96354 .94883 .93439 .92021 .90626 .69538 .99390 .89253 .86565 85248 .83949 81397 .80144 .78906 .76475 .72938 .71789 .68437 67352 .66284 .64200 0.00000 .77683 .75281 .63184 00000000 0000000 0000000 0000000 00000000 0000000 0000000 .87900 .74102 65233 0000000 0.000000 0000000 Vel. of Sound 987 941 896 8808 766 725 1766 1766 1766 1606 1567 1570 1456 1421 1386 1352 1319 1287 1225 168 1143 1084 1005 1007 989 971 938 923 909 895 888 838 838 819 802 .32500E-05 .14581E-04 .51419E-04 .58171E+00 .61272E+00 .67298E+00 .70209E+00 .37492E-03 .82834E-03 .16524E-02 .11160E+00 .13280E+00 .20670E+00 .23446E+00 .32525E+00 .35705E+00 .42150E+00 .45393E+00 .57932E-07 .81114E+00 .86079E+00 .98976E+00 .10598E+01 .59674E-01 Fugacity/ 15579E+00 ,18045E+00 26342E+00 29388E+00 38920E+00 ,51839E+00 55024E+00 64315E+00 30282E-02 51675E-02 ,83011E-02 92285E-01 48627E+00 ,75817E+00 90709E+00 .12664E-01 .18478E-01 25943E-01 ,35223E-01 46440E-01 Pressure 11185E+01 Ratio Cp J/(mol·K) 89.46 90.33 91.27 92.29 93.40 94.60 95.90 97.30 02.18 04.04 06.02 08.08 10.20 12.19 24.35 23.18 23.25 23.85 83.65 83.94 84.31 84.71 85.14 85.61 86.12 87.28 87.95 88.67 24.73 25.77 26.92 29.40 30.69 100.44 28,14 31,98 33.28 37.15 39.68 142.15 49,15 53.48 34.58 J/(mol·K) 69.61 70.88 72.26 73.79 63.45 63.12 62.89 62.76 62.73 62.79 62.79 75.44 77.24 79.16 81.20 83.31 85.32 86.54 97.63 96.54 96.73 99.68 103.87 105.36 106.88 108.41 109.95 113.02 116.06 119.06 64.43 65.04 65.74 66.54 67.45 68.48 97.45 63.18 63.51 63.92 111.41 98.47 02.41 33.07 J/(mol·K) 238.213 241.010 243.774 90.795 98.905 106.277 113.056 119.350 125.242 130.795 136.056 141.067 145.859 54.886 171.207 182.272 185.776 189.199 192.547 202.192 205.285 208.324 214.295 217.504 220.622 229.613 232.518 246.509 249.215 279.715 289.175 298.326 Entropy 99.040 78,680 83,550 63,300 210,902 223.672 226,666 235,383 54.543 259,767 269,922 59,162 264.892 P = 70 MPaEnthalpy 4248.1 4939.8 5790.2 6638.6 7486.8 8336.8 9190.4 10049.6 11791.3 13572.5 14480.1 15399.5 16330.9 17274.3 18229.4 19196.0 20173.6 21162.2 22161.4 23171.2 24191.9 25223.8 26267.2 27322.6 28389.9 31683.0 32918.9 34150.3 41706.7 43007.2 44320.5 58157.3 64032.1 70085.5 29468.3 50410.3 59143.9 15646.8 19703.4 52471.9 55385.4 57880.4 40419.1 46986.0 76307.4 56628.1 J/mol 55290 776.2 1578.2 2377.6 3176.1 3975.9 4778.7 6400.6 7222.8 8054.2 8895.6 9747.6 11484.5 12369.3 13264.8 14170.7 15086.4 16011.9 17891.1 18844.9 19808.6 20782.5 21767.1 22762.2 23767.1 56022.3 61676.9 67495.7 Energy J/mol 25830.7 40122.1 123.5 Propane Isobar at 6946.8 24634.2 28141.6 29296.5 50457.7 51627.3 52806.9 3997.0 6411.5 57636.4 38873.2 47865.5 50539.8 5198.3 45237 Derivative MPa∙m3/kg Isotherm 1.08256 1.03901 .99809 3.46205 3.26006 3.07836 2.91309 2.76141 2.62116 2.49071 2.36878 2.25438 2.14672 2.04517 1.85843 1.77247 1.61390 1.61390 1.47160 .28555 .28555 .23023 .17805 92365 85830 80109 77526 75114 .12887 95968 72863 70762 65272 58355 56215 51414 82873 66975 63685 60829 3.64424 Derivative 2.414726 2.264268 2.127251 2.001342 1.886548 1.350971 1.281273 1.215867 1.154403 1.096576 1.042115 812731 774212 737809 .467214 1.780146 1.504894 .942357 .640133 215785 Sochore 853497 533083 379317 350456 324595 2.580924 .590108 ,990780 703401 670878 583598 557630 487947 429083 244876 3,160976 2,765784 ,447614 280547 411561 MPa/K 4.60536 4.27073 3.98810 3.74637 3.55738 3.35502 3.05255 2.92594 2.81251 2.71040 2.61809 2.11684 2.07449 2.03529 1.96520 1.93386 1.90470 .85228 . 55379 . 53230 . 51400 2.45805 2.38840 2.26609 2.21226 2.16264 ,78616 .76696 .73218 .71643 .70167 .68782 .67481 .99894 .65109 .63006 .61135 87757 80671 2,53432 2,32463 .68361E+03 .67568E+03 .66781E+03 .62932E+03 .45571E+03 72442E+03 .70784E+03 .65226E+03 52745E+03 52055E+03 58461E+03 69161E+03 61425E+03 59196E+03 57003E+03 56281E+03 54851E+03 54143E+03 53441E+03 51372E+03 .48711E+03 ,43799E+03 42667E+03 .36710E+03 35031E+03 73285E+03 66001E+03 63692E+03 60678E+03 59935E+03 55563E+03 50695E+03 50026E+03 49365E+03 .48065E+03 .47429E+03 .46800E+03 46181E+03 41574E+03 40522E+03 38538E+03 Density 1662E+02 1643E+02 1624E+02 1605E+02 1587E+02 1550E+02 1532E+02 1514E+02 1196E+02 1180E+02 1061E+02 1047E+02 1479E+02 1462E+02 1427E+02 1410E+02 .1376E+02 1326E+02 1309E+02 444E+02 1212E+02 1119E+02 1090E+02 393E+02 1342E+02 293E+02 276E+02 .1260E+02 1244E+02 1228E+02 165E+02 150E+02 1105E+02 1033E+02 1020E+02 697E+02 .1681E+02 1497E+02 1134E+02 1076E+02 9932E+01 9676E+01 7944E+01 9428E+0 9189E+01 8739E+0 8325E+01 mo1/L 120,000 140,000 140,000 150,000 160,000 170,000 180,000 200,000 450,000 460,000 470,000 480,000 490,000 520,000 540,000 580,000 580,000 210.000 220.000 230.000 240.000 250.000 260.000 280.000 300.000 310.000 320.000 330.000 340.000 350.000 360.000 380.000 390.000 400.000 420.000 570,000 410,000 440.000 91.898 000.00 10,000

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